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Enhancing Educational Resilience: Applying the Flipped Classroom Model in Sri Lanka's Challenging Economic and Political Landscape

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***Abstract*—Recent economic and political instability in Sri Lanka has had a profound impact on various sectors, notably the education sector. Evidenced by the temporary closure of schools, universities, and higher education institutions, as well as the postponement of national examinations, the adverse effects of Sri Lanka's economic and political turmoil on education have been unmistakable. This educational upheaval mirrors challenges faced during the COVID-19 pandemic. In response to these challenges, some educational institutions in Sri Lanka have turned to the Flipped Classroom Model (FCR) as a means of mitigating these disruptions. This study aims to investigate the influence of the Six Hat Model, which encompasses six main directions of learning, on the quality of the FCR model. The research adopts a descriptive design and focuses on undergraduate students within the Faculty of Business Management at Sri Lanka Technological Campus. Data were collected through structured questionnaires from 141 undergraduate students. The findings of the study underscore the necessity for strengthening three critical facets: addressing challenges (black hat), acknowledging emotional factors (red hat), and promoting self-directed learning (white hat) within the Six Hat Model when enhancing the quality of the FCR model, particularly in the context of economic and political instability. Additionally, the study emphasizes the importance of staff preparation and training to optimize the outcomes of the FCR model in these challenging circumstances.**

Keywords—Six thinking hats, flipped classroom model, economic and political instability, higher education, learning directions

I. INTRODUCTION

The COVID-19 pandemic has presented formidable challenges to industries worldwide, forcing organizations to transition from conventional to online platforms in order to adapt to the new normal [1]. This shift encompasses the emergence of virtual organizations, flexible working hours, telecommuting, and remote work capabilities. Technological advancements have played a pivotal role in facilitating business operations through various digital platforms [2]. Among the various sectors affected, the higher education industry has seized the opportunity to enhance the teaching and learning experience. Globally, traditional classrooms have given way to flipped classrooms, characterized by the utilization of synchronous and asynchronous learning methods—a defining feature of the new normal in higher education [3]. While technology-enabled education does present its share of challenges, it has proven to be a valuable asset for digital learners.

In Sri Lanka, many higher education institutions swiftly transitioned to online operations shortly after the initial wave of COVID-19, which occurred between January and March 2020. Lectures were conducted virtually instead of physical classrooms, with the Learning Management System (LMS) serving as the primary point of interaction between teachers and students, aside from direct contact hours. To enhance student engagement, self-guided materials, videos, quizzes, practice questions, video recordings, and other resources were incorporated into the learning process [4]. Examinations were also conducted online, with rigorous technological supervision. This transformation from traditional to online platforms, necessitated by the limitations imposed by COVID-19, has become a gradual and transformative trend in many higher education institutions.

During the COVID-19 pandemic, the sudden need for remote work arrangements posed an unexpected challenge to SLTC, an institution that had not previously embraced online teaching. To address this challenge, the university swiftly implemented a well-planned strategy for emergency remote teaching, as outlined by [5]. This strategy incorporated both asynchronous and synchronous online learning methods, with the LMS serving as the platform for asynchronous learning and Zoom LEARN facilitating synchronous interactions. The readiness and proficiency in these technological tools emerged as a critical factor influencing teachers' engagement in the work-from-home setting, as highlighted by [6]. While many Sri Lankan universities eventually returned to traditional synchronous learning in physical classrooms as the pandemic decreased, SLTC chose to take a different path. They introduced a novel pedagogical approach known as the flipped classroom (FCR). The FCR model blends elements of asynchronous and interactive

synchronous learning strategies, offering a dynamic and engaging learning experience. This shift towards the FCR model was inspired by the positive outcomes observed during the online learning phase necessitated by COVID-19. Online learning was found to enhance students' independent learning abilities and foster self-regulated thinking, surpassing the benefits of traditional learning modes.

The FCR strategy incorporates several key elements to enhance the learning experience. Content delivery within the modules is facilitated through a LMS utilizing both synchronous and asynchronous methods. Teachers have the flexibility to choose their preferred mode of delivery, allowing synchronous learners to engage in real-time via Zoom LEARN, while recorded online lecture sessions are stored on the LMS for future reference. Alternatively, those opting for asynchronous learning can upload pre-recorded videos or PowerPoint presentations. Students are encouraged to ask questions and clarify concepts via chat (Discussion Forum) in the LMS. After each lesson, synchronous discussion sessions take place, both in face-to-face settings and online via Zoom. These discussions were introduced to provide students with additional opportunities for interaction with their instructors. To ensure continuous improvement, student feedback is collected mid-semester and at the end of the semester, guiding ongoing development of the process. This comprehensive approach aims to create an engaging and effective learning environment that meets the diverse needs of students.

The adoption of the FCR model at SLTC in response to the new normal situation has sparked criticism among both staff and students for various reasons. One primary point of contention revolves around the quality of online education integrated into the FCR model. Furthermore, there has been debate surrounding the FCR model's efficacy in developing students' thinking skills. De Bono's Six Thinking Hats model provides an analytical framework to examine this matter [7]. This model encompasses six directions of thinking, each associated with a colored hat, including Information (white hat), Feelings (red hat), Thinking about Thought (blue hat), Creative (green hat), Challenges (black hat), and Constructive (yellow hat). While some researchers [8] have discussed various FCR methods and their effectiveness, there has been limited exploration of the direction of thinking within this context.

The study recognizes the need to explore both the quality and the directions of thinking in the FCR model. Consequently, the study aims to address this research problem, with the objective of finding the impact of the six hats of the FCR model on quality of educational delivery through FCR. The significance of this study lies in its potential to improve the quality of academic delivery, considering the six thinking hats within the FCR model. Additionally, it contributes to the theoretical aspect by delving into the relatively under-researched area of academic delivery from a quality perspective.

II. Literature Review

A. FCR Model

The FCR is a student-centered learning method consisting of two parts interactive learning activities during the lesson and individual teaching based on the computer out of the lesson [9]. FCR model has also been identified as 'what is done at school done at home, homework done at home completed in class' [10]. Key information is offered by the resources and materials shared by the facilitator before commencing the session. Activities including problem-solving, discussion and brainstorming are performed during class time and the facilitator has the role of guide in the synchronized process. In flipped classroom approach, Facilitators prepare videos about the subjects before teaching. Students are then expected to refer to the videos before starting the session. The lesson starts with short questions and answers. If there are points in a lecture that are not understood, they are explained. During class time, students are allowed to learn by discussing. However, in the traditional approach teaching the subject takes the most of course time [10].

The advantages of the flipped classroom derive from both an individual learning process and the in-class learning process. The advantages that expressed are; students can access lecture videos whenever and wherever they want and it provides students to learn at their speed [11]. The students educated with this approach are encouraged to think both within and outside of class [12]. Further, it includes both active learning and the advantages of individual learning [9]. Despite these advantages, flipped classroom approach provides students more time to make inventive research [13].

Even with these advantages, a number of scholars have also pinpointed its limitations. The difficulties that may occur when the students do not watch the videos before coming to the class [14]. Facilitators may have difficulty understanding whether the students do their responsibilities out of class or not [15] From the facilitator’s side not preparing or broadcasting lecture videos but preparing in-class activities and integrating them into flipped classroom approach is also regarded as one of the main limitations [16]. The flipped classroom model is developed pedagogically by using educational technologies to create the most efficient time for class activities. Students can utilize technological equipment, develop their abilities, create interactive discussion conditions, and discover different learning methods with different learning activities.

Flipped classroom approach increases students’ active engagement in the class [17]. Classroom engagement, which is one of the vital influencers to create an effective learning environment, is regarded as an indicator of student achievement [18]. In its simplest forms, classroom engagement can be identified as the active involvement of the student in learning activities [19]. On the contrary, classroom engagement as the willingness of the student to engage in daily school activities, such as continuing to school, doing homework, and listening to the teacher in class [20].

The low level of classroom engagement creates negative effects on course performance and the learning process [21]. In this context, the importance of active and collaborative learning, academic activities, effective communication with the teacher, and educational experiences within the scope of classroom engagement [22]. Students’ classroom engagement levels are evaluated by affective engagement,

cognitive engagement, and behavioral engagement [21]. In the classroom, affective engagement refers to the positive feelings of students such as interest, excitement, and amusement. Cognitive engagement refers to the processes such as meaningful processing, strategy use, concentration, and metacognition. Behavioral engagement refers to observable behaviors such as asking questions, being active in team-works and completing tasks without delay [19].

A. Six Hat Model

Education consists of two main goals which are transmitted to students: the first goal, what to think, is the transmitting of subject matter and acquiring basic knowledge; the second, how to think or critical thinking, involves cognitive process instruction [23]. In the process of understanding critical thinking, many definitions and descriptions have been given to the term [23] [24]. While some theories use the term interchangeably with higher-order thinking skills (HOTs) [23], others believe that critical thinking is included in higher order thinking skills along with creativity and other thinking skills [24]. Nonetheless, common elements have been distinguished such as information processing, analysis, problem-solving, and metacognition [25]. Often the second goal, how to think, is so subtle, that instructors and students fail to recognize and realize its absence [23]. Thankfully, Bloom's Taxonomy in 1950 clears this vagueness as it acts as a base for critical thinking by providing a framework for classifying statements of what we expect or intend students to learn as a result of instruction [26]. Thinking skills in both the original taxonomy and the revised Taxonomy by Anderson (1990) are organized into six levels, from the most basic to the higher order levels of thinking [27]. While the original taxonomy develops in the cognitive domain, the revised taxonomy consists of a two-dimensional framework: knowledge and cognitive processes [26]. As such, Anderson explains that the shift of the six categories from noun to verb forms is to reflect the different forms of thinking as an active process [27].

Similar to the transmission of what to think and how to think, Bloom's taxonomy has two tiers namely lower order and higher order thinking skills; where the lower order levels act as a base for the higher order thinking skills which are focused on the top three levels of the Taxonomy: analysis, evaluation, and creativity [24]. Higher order thinking skills are thus grounded in the lower order skills namely discriminations, simple application and analysis, and cognitive strategies, and are linked to prior knowledge of subject matter content [28]. By successfully applying these skills, King et al explain that it will result in explanations, decisions, performances, and products that are valid within the context of available knowledge and experience, and promote continued growth in these, as well as other intellectual skills [28]. While Bloom's Taxonomy has been the mainstay in higher level thinking skills [29], often referenced to connect critical thinking and creative thinking [24], the 'Six Thinking Hats' is a thinking tool which De Bono's describes as a simple, effective parallel thinking process that helps people be more productive, focused, and mindfully involved [7]. In applying the Six Hats, students are stimulated to think and control their learning [30] as it requests specified modes of thought which allow the thinker to simplify thinking by dealing with points consecutively and allows a switch in thinking as mentioned [31]. Hart and Nolan emphasize that the purpose of employing thinking tools in the inquiry classroom is for facilitators and students to work with and as inquirers to confront their notions and ideas about the way the world works and about the meaning of teaching and learning as a process rather than mere knowledge acquisition [31]. In contrast to Bloom's taxonomy, the Six Hats has no fixed order [32]. However, when applying this parallel thinking skills concept, thinkers are required to look in the same direction at any one point, though the direction can be changed [31]. As ideas are encouraged to be explored from a variety of angles, it provides a space for critical thinking and creativity [32] [24].

The need of modern education context expects students to have the ability to think, and to enable them to solve problems they may face in their academic career and make decisions. There is a strong emphasis on infusing thinking skills into the curriculum such as recalling, classifying, comparing, inferring, generalizing, evaluating, experimenting, and analyzing. The work of Edward de Bono has given educators a repertoire of a unique strategies to use with their students, namely, Six Thinking Hats. Six Thinking Hats is an internationally recognized tool to teach thinking in all content areas. A simple and practical way of carrying out parallel thinking is the Six Thinking Hats method. Although students may have completely dissimilar ideas at the beginning, they can present similar ideas objectively with a change in the hats [7]. The Six Thinking Hats teaching technique provides students with specific thought patterns and allows them to observe topics from different angles. This method is of fundamental significance because it provides us, for the first time, with a practical method of constructive thinking. The Six Hats can be used individually or in combinations and for specific results, the hats can be ordered and used deliberately.

The white hat (Neutrality, Think about the facts). White hat thinking is a way of asking for facts and figures to be put forth neutrally. It encourages the thinker to separate what is fact and what is interpretation. The more information people have the better will their thinking be and the more appropriate their actions [31]. This hat is usually used at the beginning of a session as a background for the thinking that is going to take place as it provides a more rational approach. The white hat seeks out information that is missing and known.

The yellow hat (Optimistic, think about the positive aspects of a topic). The yellow hat focuses on identifying the values, advantages, or benefits of something [33]. It is the optimism hat. Everyone in turn has to say what is good about the proposal, or idea. Even if one thinks the idea does not work well, he has to find some redeeming qualities and good points about it [34]. People put on yellow hats to find ways to solve the problem; because they are optimistic. They are creative when they wear their yellow hats. Their thinking revolves around how it can be done to enjoy the benefits. Without the yellow hat, creativity is almost impossible because we would never see the benefits of an emerging idea.

The black hat (Critical, judgmental, and think about the negative aspects of a topic). The black is the cautious hat, judging the 'fit' of the facts, experience, system, law, policy, and ethics. It denotes constructive criticism. This angle of thinking explores the problem with a topic or proposal; identifies flaws, risks, and obstacles; and exercises judgment and caution [35]. The black hat is for critical thinking and risk assessment. This is the logical positive. Why something will work and it will offer benefits? It can be used in looking forward to the results of some proposed action but it can also be used to find something of value in what has already happened. The black hat is the hat of survival. Overuse of the black hat may lead to an unhealthy cynicism where people only seem to find fault with everything.

The red hat (Emotions, Examine a topic through emotions and feelings) Red hat symbolizes feelings and hunches. A red hat is a color of emotion and passion. Logic is not required [36]. Too often we let our emotions make our decisions. Red hat gives us a separate context to state our true feelings and then explore their implications. Red hat thinking can praise or criticize an idea based on raw, subjective feelings [37]. What are my feelings now? What does my intuition tell me? Simply put Red hat thinking looks at a topic from the point of view of emotions, feelings, and hunches. The Red hat requires no justification. Thinkers are encouraged to contribute to the emotional aspects of the problem or idea under discussion [35]. With the red hat, people have to say how this proposal makes them feel emotional. For example, some might say they feel threatened or scared by this idea. Others might say they feel excited [34].

The green hat (Creativity, New ideas, Brainstorming, and Prediction). The green hat symbolizes creative thinking. It gives the go-ahead to generate alternatives and explore ideas. It is in nature that a green hat thinker would say, 'We need to explore new possibilities' [38]. It encourages the use of creative solutions to problems. It seeks to answer questions such as 'Are there other ways we could do this? What else could we do?' Green hat thinking offers sufficient solutions to the black hat thinking problems. 'What should you do then with the ball? Play the ball outside the house!' It is used to explore, investigate, decide, and, in so doing, give way to freewheeling thinking [36]. Green hat of thinking provides provocations, new ideas, and outrageous alternatives, with no effort to criticize or evaluate the merits of these ideas [37]. One can use green hat thinking to shake things up by making turbulence with novel ideas while setting off in a new direction. This hat of thinking involves the cognitive processes of identification, clarification, generation of solutions, predicting consequences, and evaluation of solutions [33].

The blue hat (Reflect, think metacognitive, and try to grasp the big picture, a summary of a topic). The understanding and reflection are denoted by the blue hat. It focuses on outlining the problem and what is being thought about. The blue hat can be used both at the beginning (for planning) and at the end (for summarizing) of each session for process control [33]. Wearing the blue hat is like being in the sky above, looking down on a situation, and planning for the best way to think about it. It is a helicopter view of the big picture. It manages the thinking process by setting the agenda and deciding on the next step. It wraps up the process by making the decisions, summarizing, and concluding on the action taken. De Bono emphasizes the need for a thinker to be able to look at his or her thinking. In fact, he should be able to reflect on the thinking he has used in performing a thinking task. The Blue hat thinker organizes the thinking itself and calls for the use of other hats [31].

Thus, the study focuses on testing the following hypotheses:

HA1: The white hat has a positive impact on the quality of the FCR model

HA2: The red hat has a positive impact on the quality of the FCR model

HA3: The black hat has a positive impact on the quality of the FCR model

HA4: The yellow hat has a positive impact on the quality of the FCR model

HA5: The green hat has a positive impact on the quality of the FCR model

HA2: The blue hat has a positive impact on the quality of the FCR model

III. METHODOLOGY

Research philosophy as a system that contains beliefs and assumptions on knowledge development [39]. This is about what a researcher is doing when conducting research or developing new knowledge in a certain field. Researchers are required to make a number of various assumptions at every stage of research [40] in the form of epistemological assumptions reflecting the assumptions regarding human knowledge, ontological assumptions reflecting the realities encountered in the study and the axiological assumptions reflecting the researcher's own value system influences for the research process. Since the research question of this study is to evaluate the quality and the direction of the FCR model this study owns a quantitative aspect and hence follows a positivism philosophy along with a deductive approach. The research strategy of this study is survey research, and the context includes the SLTC.

The study's focus centers on the SLTC, specifically targeting the undergraduate student population within the Faculty of Business Management. The sample comprises 150 undergraduate students from the SLTC Faculty of Business Management, and the sampling method employed is convenience sampling. To gather responses, an online questionnaire was distributed among the selected sample units.

The conceptual framework of the study is depicted in Fig. 1. Accordingly, the six hats: information, feelings; thinking about thought, creativity, challenges, and constructive design guidelines represent the study's independent variables whereas the quality of the academic delivery via FCR represents its dependent variable.

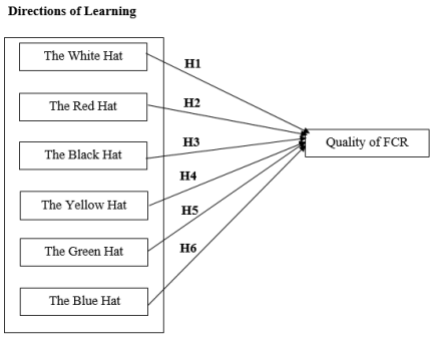

Fig. 1. Conceptual framework of the study, (Source: Author constructed)

IV. Results and Discussion

Initially questionnaires were distributed to a group of 150 undergraduate students within the Faculty of Management at SLTC. Following the removal of outliers and a thorough data cleaning process, the dataset was refined to include 141 valid responses for subsequent analysis. The collected data underwent analysis using IBM SPSS (International Business Machines Corporation's Statistical Package for the Social Sciences), involving several steps.

Descriptive analysis was used to examine the demographic profile, as summarized in Table I. Among the 141 students, 74 were male, and 67 were female. The majority, approximately 83%, fell within the age category of 19-23 years. Furthermore, 42.6% of the students were in their first year of university, while 35.5% were in their second year of studies.

TABLE I. Demographic Profile

demographic profile variables	*Respondents' details*	*Number of respondents*	*Percentage of respondents*
Gender	Male	74	52.5
	Female	67	47.5
Age	<18 Years	1	0.7
	19-23 Years	117	83.0
	24-28 Years	19	13.5
	>29 Years	4	2.8
Year of Study	01st Year	60	42.6
	02nd Year	50	35.5
	03rd Year	20	14.2
	04th Year	11	7.8

Source: Survey Data

Reliability in the context of this study, assesses the consistency of responses provided by survey participants. To measure the internal consistency and reliability of the variables, a calculation involving the coefficient alpha (Cronbach's α) was performed, along with the examination of item-total correlations for each variable. Following the criteria set [41]; a Cronbach's alpha coefficient of 0.7 or greater is considered acceptable. The results of the reliability tests, including the final Cronbach's alpha coefficients for each variable are presented in Tab. 2.

TABLE II. Cronbach's Alpha Reliability Table

Variables	*Number of items*	*Cronbach's alpha*
The White Hat	4	0.748
The Red Hat	7	0.890
The Black Hat	4	0.887
The Yellow Hat	4	0.895
The Green Hat	5	0.950
The Blue hat	5	0.961
Quality of FCR	4	0.928

Source: Survey Data

All the Cronbach's alpha coefficient values for each variable exceed 0.7, indicating that the survey instrument is reliable, and there is a high level of internal consistency.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, assesses the ratio of correlations and partial correlations [42]. This metric helps determine the extent to which correlations are influenced by the shared variance across all variables rather than specific pairs of variables. KMO values range from 0.00 to 1.00 and can be computed for both the total correlation matrix and individual measured variables. It is generally desirable to have an overall KMO value of $\geqslant$ 0.70, [43]. Conversely, values below 0.50 are typically considered unacceptable (Hair et al., 2010). Such values suggest that the correlation matrix cannot be effectively factorized.

The Kaiser-Mayer-Olkin (KMO) and Bartlett's test were used to examine the appropriateness of the factor analysis (see Table III).

TABLE III. Cronbach's Alpha Reliability Table

Variables	*Kaiser-Meyer-Olkin Measure of Sampling Adequacy.*	*Bartlett's Test of Sphericity*		
		Approx. Chi-Square	*df*	*Sig.*
The White Hat	.592	114.497	3	.000
The Red Hat	.876	575.074	21	.000
The Black Hat	.822	309.555	6	.000
The Yellow Hat	.827	360.297	6	.000
The Green Hat	.894	705.169	10	000
The Blue hat	.911	801.641	10	.000
Quality of FCR	.851	458.787	6	.000

Source: Survey Data

The KMO values for five variables are close to 1 (>0.822), and one variable has a KMO value exceeding 0.5. This suggests a significant degree of information overlap among the variables and the presence of strong partial correlations. Consequently, conducting factor analysis seems plausible. The Bartlett test assesses sphericity, indicating the proximity of the correlation matrix to an identity matrix. Significance values below 0.05 for all variables in Bartlett's test indicate that the data is suitable for factor analysis.

A normality test was conducted to assess whether the data followed a normal distribution, and the results are

presented in Table IV. According to the Kolmogorov-Smirnov test (with a significance level of $P < 0.05$), it was determined that the data for the dependent variable do not exhibit a normal distribution.

TABLE IV. TESTS OF NORMALITY

	Kolmogorov-Smirnov[a]		
	Statistic	***df***	***Sig.***
QLTM	.236	141	.000

a. Lilliefors Significance Correction

Given that the data did not conform to a normal distribution, the Spearman's rank correlation coefficient (Spearman's rho) was used to assess the relationships between variables. The results of these correlation tests can be found in Table V. It's noteworthy that all six thinking hats, representing six distinct learning directions, displayed strong and positive correlations with the dependent variable, which pertains to the quality of FCR. This suggests a significant association between these thinking hats and the quality of FCR.

TABLE V. SPEARMAN'S RHO

	QLTM		
WHM	Correlation Coefficient	.505**	Strong positive correlation
	Sig. (2-tailed)	.000	
RHM	Correlation Coefficient	.565**	Strong positive correlation
	Sig. (2-tailed)	.000	
BKHM	Correlation Coefficient	.465	Strong positive correlation
	Sig. (2-tailed)	.000	
YHM	Correlation Coefficient	.637**	Strong positive correlation
	Sig. (2-tailed)	.000	
GHM	Correlation Coefficient	.695**	Strong positive correlation
	Sig. (2-tailed)	.000	
BHM	Correlation Coefficient	.687**	Strong positive correlation
	Sig. (2-tailed)	.000	

***. Correlation is significant at the 0.01 level (2-tailed).*

TABLE VI. HYPOTHESIS TESTING

	Standardized Coefficients	t	Sig.	Hypothesis
	Beta			
WHM	.089	1.250	.213	HA1 Rejected
RHM	-.075	-.791	.430	HA2 Rejected
BKHM	.006	.075	.940	HA3 Rejected
YHM	.239	2.699	.008	HA4 Accepted
GHM	.306	3.306	.001	HA5 Accepted
BHM	.330	3.560	.001	HA6 Accepted

a. Dependent Variable: QLTM

Regression analysis was used to evaluate the research hypotheses. As indicated in Table VI, three of the alternative hypotheses (HA1, HA2, and HA3) are rejected, as their associated p-values exceeded 0.05. Conversely, the remaining three hypotheses (HA4, HA5, and HA6) are accepted, as their p-values are less than 0.05.

However, the fundamental premise of a 'thinking skills' approach to education is rooted in the idea that the quality of students' lives and their learning experiences is intricately linked to the caliber of their thinking [25]. While some theories use the term interchangeably with 'higher order thinking skills' [23], others employ it to encompass not only higher order thinking skills but also creativity and various other forms of thinking skills [24]. Additionally, there are arguments positing that thinking is a holistic activity [25]. Nevertheless, a concern that traditional education, focused on prescription, often funnels students through a series of narrow educational pathways, limiting their capacity for 'possibility thinking' as they grow [7]. To address issues related to emotions, helplessness, and confusion that can arise during critical thinking, the six thinking hats model was developed.

Based on the findings, the blue hat (Control of Thinking) is the most important hat and has a strong positive impact on the quality of the FCR model. Blue hat thinking contributes to critical thinking and problem-solving by involving higher-order thinking and cognitive control. The teaching methods in the FCR model help with focus, summarization, conclusion drawing, and action planning. Further, access to videos and materials in the Learning Management System (LMS) aids student reference.

Following the blue hat, the green hat emerges as the next most crucial element that contributes to improving the quality of the FCR model. The green hat symbolizes creative critical thinking and problem-solving. Within the context of the FCR model adopted by SLTC, students are motivated to generate novel ideas and concepts. This motivation is fostered through innovative learning approaches, self-study methods, creative assessments, and other strategies that not only boost creativity but also enhance the overall quality of the FCR model. Moreover, the green hat effectively addresses the challenges associated with the black hat while reinforcing the values represented by the yellow hat. In the FCR model, students are initially provided with a hint or starting idea, which they then use as a catalyst for their own thinking. They actively contribute their ideas to the collective pool of insights generated by the entire class, fostering collaborative and creative thinking.

Yellow hat thinking brings a sense of optimism and a resolute determination to succeed into the critical thinking and problem-solving process. When students put on the metaphorical yellow hats, they embark on a quest to discover solutions to problems, driven by their inherent optimism. The FCR model serves as a platform that facilitates critical thinking and problem-solving, particularly within the context of problem-based learning, allowing students to harness their positive outlook as they tackle challenges.

In contrast, the white hat, which is primarily concerned with gathering factual information in an objective manner, does not appear to significantly impact the quality of the FCR model. White hat thinking is instrumental in identifying the necessary information and subsequently in the collection of that information, involving both individual and

collaborative efforts in the search for data. To enhance the effectiveness of white hat thinking, it is recommended to adopt student-centric approaches that empower students to engage in self-directed learning, such as self-study initiatives or think-pair-and-share sessions. Typically, white hat thinking is employed at the outset of a session, providing a foundational background for the subsequent thinking processes. Its primary purpose is to uncover missing or existing information, making it an essential component of the overall problem-solving approach.

Similarly, the red hat, which encompasses emotions, feelings, hunches, and intuitions, does not seem to significantly influence the quality of the FCR model. Emotions associated with the red hat may include joy, fear, anger, jealousy, and sorrow. Nevertheless, within the framework of the FCR model, there is an opportunity to stimulate positive emotions through a range of teaching and learning methods. These methods can include synchronous and asynchronous approaches, such as visualizations, case studies, group activities, and more. By incorporating these strategies, the FCR model can actively engage students and cultivate positive emotional responses, enhancing the overall learning experience.

The black hat has no impact on quality of the FCR model, whereas SLTC should focus more on the black hat. It implies challengers that the critical, judgmental and think about the negative aspects of a topic. The black hat describes as the hat of survival, hence overuse of the black hat may lead to an unhealthy cynicism where people only seem to find fault with everything. To sustain the black thinking hat, the lecturer can ask students to check for evidence that supports what they articulate. They should check for the truth or validity of logical arguments raised. They should examine suggestions made to see if they are feasible, given the prevailing circumstances. They have to think deeply about the potential consequences of their actions before making judgments.

The black hat, which is designed to provoke critical judgment and investigate into the negative aspects of a subject, does not appear to significantly impact the quality of the FCR model. However, it is suggested that SLTC should pay more attention to the black hat thinking approach. The black hat serves as a mechanism to challenge ideas and engage in critical analysis, providing a balanced perspective on issues. It's often associated with survival thinking, but it's essential to avoid its overuse, as it can lead to an unhealthy cynicism where individuals habitually find fault in everything.

To effectively incorporate the black hat thinking, instructors can encourage students to seek evidence supporting their arguments, assess the validity of logical reasoning, scrutinize the feasibility of suggestions in the given context, and contemplate the potential consequences of their actions before making judgments. By striking a balance and using the black hat carefully, students can foster a more comprehensive and critical understanding of the subjects they are studying.

V. Conclusion

Findings of the study highlight the varying impacts of different thinking hats within the quality of FCR model. While the blue, green and yellow hats significantly enhance the FCR model's quality, the white and red hats have a lesser influence on quality of FCR model. Notably, careful use of the black hat is recommended for balanced critical analysis in FCR model.

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