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UNMASKING THE EFFECTS OF TEACHERS WHISTLEBLOWING SOME ATTRIBUTES ON IMPLEMENTING STEM EDUCATION: NATIONAL CURRICULUM DOCUMENT 2006 PERSPECTIVE

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Abstract

Purpose of the study: The purpose of the current research was to measure the effect of teachers self-efficacy, locus of control, and emotional labour on implementing STEM education, focusing on national curriculum document 2006 concerns/guidelines. The researchers enthusiastically explored and reported actual situations happening to implement STEM Education in male public sector primary schools of district Lahore, Punjab province of Pakistan.

Methodology: The researchers structured quantitative leading to *ex post facto* research focusing positivist paradigm on a sample randomly selected 530 participants. The researchers administered Henson (1999) *Sources of Self-efficacy Inventory*, Rose and Medway (1981) *Locus of Control Scale*, Çukur (2009) *Teachers Emotional Labour Scale*, Nistor et al. (2018) *Teachers questionnaire on STEM Education Practices* and self-constructed questionnaire on national curriculum document 2006 based concerns/guidelines on STEM Education, to collect the data from male primary schools teachers working in public sector schools of Lahore. The researchers run regression analysis and *Pearson Product Moment Correlation (r)* to analyze the data.

Main findings: Findings of the current research revealed that teachers self-efficacy have affected 82.90%, locus of control 65.60%, emotional labour 70.50% and national curriculum document 2006 have affected 28.10% on implementing STEM education. Moreover, a significant strong relationship existed between self-efficacy and STEM education (r = .910**, n = 528, p < .05), locus of control and STEM education (r = .873**, n = 528, p < .05), emotional labour and STEM education (r = .840**, n = 528, p < .05) and a significant and weak association yield between national curriculum 2006 concerns and STEM education (r = .002**, n = 528, p < .05).

Applications of the study: The findings of the current research will be applicable for primary schools male teachers who break the ice about their cognitional, social, and emotional attributes that are practised to implement STEM education focusing national curriculum document 2006; as they monotonously worked for students lap of luxury.

Novelty/originality of this study: There are hardly any studies conducted on self-efficacy and STEM education but, void researches structured to measure the effect of teachers locus of control, emotional labour, and national curriculum document 2006 based concerns/guidelines on implementing STEM education. The authors has made a significant contribution by portraying clear pictures of current appealing situations happening in male public sector primary schools of district Lahore of Punjab-Pakistan.

Keywords: *Emotional Labour, Locus of Control, National Curriculum, Self-efficacy, STEM Education.*

INTRODUCTION

Humans had been struggling to satisfy their needs since ago. Scientific innovations are spreading rapidly through the applications of contemporary education (DeBoer et al., 2018; Kaya et al., 2021). Societies put their collective effort and, the birth of Science, Technology, Engineering, and Mathematics *STEM* education open new horizons to conquer this universe hidden fact/mysteries (Lehrer & Schauble, 2021). Inventions in STEM education have given wings to humans to fulfill their fundamental needs (Sandrone et al., 2021). For this purpose, teachers fulfil community needs through prophecy profession; teaching. Teaching is a multifaceted process and art through which teachers transmit their experiences and ideas among learners. It is a medium of transferring knowledge, information, and concepts to bring dynamic change (Elder, 2021; Sáez de Cámara et al., 2021; Tso et al., 2021) in students behaviour to make them scientist, technologist, engineer, and mathematician (Vlasopoulou et al., 2021). Teachers apply their cognitive, pedagogical, emotional, spiritual, scientific, practical and social knowledge to cope with students with present-day educational and scientific needs for societal development (Micari & Pazos, 2021; van Rooij et al., 2019).

Self-efficacy is rooted in social cognitive theory; Theory states that cognitive processes mediate changes in individuals behaviour. This changed human behaviour acquires and reshapes new behavioural patterns (d'Arma et al., 2021; Schunk & DiBenedetto, 2020). This developmental behavior moves towards the model of human observation and shapes symbolic formation towards a new behavioural model (Zalazar-Jaime & Medrano, 2021). Resultantly, symbolic figures express the performance of the innovative human behaviour called reciprocal determination (Barton & Dexter, 2020). Mutual determination is linked with individuals personal factors: cognition effect and biological events; interpretation of human behaviour and, an environment that is the cause of triadic joint determination (Collings & Eaton, 2021). These factors are interlinked with each other and bring change in human behaviour. These are individuals owns embedded learning abilities and responses towards innovative behaviour based on the received supply of the information (Lee,

2020). Information obtained from actions is symbolically stored as a pivotal part of learning and are refined via personal corrective adjustment (Popov & Ustin, 2021). Self-efficacy is the staples of mastery experiences, vicarious experience, social/verbal persuasion, and emotional and physical state (Frey, 2018; Yough, 2019). *Mastery of experience* is teachers crucial resource of valuable beliefs (Byars-Winston et al., 2017). Teachers construct self-valued items to fill in from their students regarding their achievements (Sheu et al., 2018). It concentrates on humans success or failure, focusing on past experiences. The collected information from previous experiences is internalized (Butz & Usher, 2015). *Vicarious experience* provides a basis for the human to gain the latest innovations without active involvement in trial and error procedures (Byars-Winston, 2017). Others success and achievements arouse individuals confidence and make them progressive (Ahn et al., 2017). Continuous watching of successful peoples achievements makes individuals achieve targets as alike (Usher et al., 2019). *Social/Verbal persuasion*s are oral support on individuals performance towards required task achievements (Falco & Summers, 2021). Positive persuasions enhance confidence for victorious achievements and, destructive persuasions rate decline level of self-belief. Provision of supports to destructive persuasions strengthens self-efficacy (Talsma et al., 2018; Yough, 2019). Teachers and parental involvement, motivation of trainers and coaches strengthen individuals confidence towards successful tasks (Kuyini et al., 2020). Convinced teachers communicate with tedious students to build their strong confidence on abilities (Falso & Summers, 2021). *Emotional and physical state* shapes peoples efficacious beliefs in abilities (Gardner, 2021). Stress is the symbol of weakness regarding one low performance (Wilson et al., 2020). Positive sentiment enhances capabilities for better performance (Moskowiz et al., 2021; Phan & Ngu, 2016; Sheu et al., 2018; Wang et al., 2021).

Locus of control is derived from the social learning theory, put forward by Jollian. B. Rotter, an eminent Psychologist of the United State of America (Carducci, 2020). Theory reports that humans personality, an important measureable construct for investigators, has a strong relationship between the person and his/her constructive environment (Juwel & Ahsan, 2019; Siddiki et al., 2017). Individuals behaviour is derived from one interrelations living in a purposeful atmosphere (Nevid, 2021). Rotter argues that human personality remains changeable in every moment as a product of passing every second (Ezirim et al., 2021; Isidore & Arun, 2021). Theory predicts that when humans are near to success, they insert more potential to achieve required targets (Juwel & Ahsan, 2019). Social learning interconnects with individuals entire environment (Schunk & DiBenedetto, 2020), and his/her behavioural activities mediate changes in task accomplishment. Dynamic presentation of personality remains to change as the appearance of one personal experiences that modify opinion towards their entire career predictions (Kovach, 2018). Theory justifies an accurate number of prophecies concerning measurable constructs; *Locus of control*. Locus of control refers to an individual's confidence in his/her abilities that help to achieve life achievements (Carton et al., 2021). Term locus of control is individuals constant attribute and belief on actions regarding achievement or disappointment that directly influences in individuals learning, inspiration, and performance as well (Çelik & Sariçam, 2018). Locus of control deeply explains individuals performance and put imperative influence on their potential to achieve required attainments (Francis, 2021). Locus of control is categorized into two dimensions (Al Mulhim, 2021). *Internal locus of control* has a strong relationship with self-confidence that took place as a result of potentials and brings permanent behavioural changes in personality development (Smidt et al., 2018). Human is in the hedonism that internal locus of control facilitate them towards successful life focusing own capabilities and represents one's continuous belief system on his/her potentials (Bojnourd, 2021), Internals are creative, enthusiastic about assigned tasks and built social and educational relations with peers, colleagues, and fellows (Munawir et al., 2018). *External locus of control* correlates with those fundamental factors that are not in control of human beings like; luck, change, one's behavioural modification, individuals successful activities and difficulty level of assigning task (Kiral, 2019; Tas & Ískendrer, 2018). Externals avoid accepting a difficult task, keep away from challenging issues, and passively participate in gathering and educational concern (Kobayashi & Farrington, 2020).

The concept of emotional labour is interconnected with the work of eminent sociologist Hochschild put forwarded in the era of 1983 (Ford, 2021; Hochschild, 2012; Hout & Maggio, 2021). Emotional labour is a burning construct (Ogunsola et al., 2020) that assist employees to identify the institutional quality of association with peers (Gabriel et al., 2015; Hofmann & Stokburger-Sauer, 2017), the procedure of coping sentiment, and passion representing task development (Zou & Dahling, 2017), capable apprentice to put constructive/destructive effects on workers surface performance (Andrew et al., 2016) and proficient employees to interpret their emotions at their workplace (Horner et al., 2019) following assigned set standards (Richard et al., 2016). Teachers emotional labour exemplifies the procedure of managing and interpreting their emotions to obtained optimal achievements in students didactic success (Ma et al., 2021). They practised their feelings in classrooms focusing on the aspect of expression management (Eroglu, 2010). Teachers, emotional labour is surface acting that regulates and expresses teachers exact emotions in the classrooms (Fouquereau et al., 2019). Teachers emotional labour is measured through *surface acting;* buffers the effect of internal feelings to the contrary with external performance during peer relations, meeting with others, and mutual discussions. In the case of many stakeholders, one waits to listen to others responses and feeling due to the slow process of communications. It sketch icon of regret and anxiety on individuals face although he/she may try to show amusement and encouraging gesture among peers (Yang et al., 2019). Although, individuals are implanted in cultural boundaries that enable them to show off feelings, emotions outwards, which provide them peace and calm (Lu & Guy, 2019). In the case of *deep acting*, employees manipulate their inner sense to control exact circumstances. Workers remained more conscious and eagerly showed their facial and mental position concerning outer and internal states (Diefendorff et al., 2005; Horner et al., 2019). Teachers control and interpret their pedagogical content knowledge among students based on

their bottomless performance in classrooms. They intensely impart instructions and disseminate knowledge for students didactics understanding (Pemanasari et al., 2021; Rabin et al., 2021) in STEM Education. The ultimate aspect of measuring workers emotional labour is the inadequate *emotions regulations* that individual intentionally attempt to interpret his/her feeling and sentiments among peers. It entails allowing emotions and feelings naturally and originally. Employees are capable of expressing their internal situation/thoughts and feeling with higher authorities (Grandey & Melloy, 2017). They are supposed to unpretentiously express their innate and factual emotions as a third way of attaining aspect of emotional labour (Humphrey et al., 2015). Interpretations of naturally faced sentiment play a significant role in showing the incredible part of emotional labour (Gabriel et al., 2015). Finally, the aspect of *emotional termination/deviance* refers to the strategy used to interpret real emotions during working hours. In most cases, works; teachers are unaware of the customers; students, and potentially showed their internal feelings with passion and eagerness. This strategy is significant in the case of qualitative studies where the interviewer and the interviewee are unknown to each other (Yang et al., 2019). When teachers applied the approach of emotional termination/deviance in classrooms, they remain pathetic, embarrassed, confused, and upset. Gradually, teachers, such sorts of emotions are abolished and crackdown (Çukur, 2009). Resultantly, teachers become irritated, aggressive, and hate with their students and, are unhappy with their jobs and family life (Burić et al., 2021).

The contemporary era is considered as the age of science and technology that demands technical and scientific development, that is approached through the implementation of Science, Technology, Engineering, and Mathematics; STEM education. STEM is a multi-disciplinary integrated approach of the 21st Century. Primarily term STEM is the staple of Science, Mathematics, Engineering, and Technology; SMET that was named as STEM by National Science Foundation; NSF. In the 1990s, the notion was vocalized as Science, Technology, Engineering, and Mathematics by NSF (Sanders, 2009). STEM education revolves around the teaching-learning process which amalgamates pedagogical content and abilities of Science, Technology, Engineering, and Mathematics (Pawilen & Yuzon, 2019) also rooted in money-making forcefulness in the international market to seal output; satisfactory certification, sustaining intensity of energy, and its productivity (Pleasants et al., 2019). Ultimately STEM education offers the prospect for learners in strengthening their problem-solving skills, makes them innovators, creators, self-efficacious, technologically literate, communicator, critical thinkers, and problem solvers (Vincent-Ruz & Schunn, 2018). Applications of STEM education have been contemplated since 1,990s and make students proficient with modern skills. It speedily gives birth to scientific society and plays an enormous role in students success (Kelly & Knowles, 2016).

Continuous applications of teachers pedagogical applications enhance students satisfaction and concerns towards better science understanding (Bozkurt et al., 2019) and STEM education (Minnotte & Pedersen, 2021). STEM has gained attention to develop skills among students and prepare teachers to compete for the global economy. Advancement in the era of the twenty-first century refers to transformation for nurturing the ability of learners through STEM education, focusing on their critical and reflective skills. STEM education is an interdisciplinary approach to infuse four curricular areas; science, technology, engineering, and mathematics, to enhance students the content knowledge, conceptual learning (Hacioglu & Gulhan, 2021). STEM education focuses on improving the pedagogical practices of teachers and contributes to increasing students learning (Li et al., 2020). STEM education amalgamates the pedagogical content and abilities of Science, Technology, Engineering, and Mathematics (Schreffler et al., 2019). It offers the prospect for learners in strengthening their problem-solving skills, makes them innovators, creators, self-efficacious, technologically literate, communicator, critical thinkers, and problem-solvers (Büyükdede & Tanel 2019). Applications of STEM education makes students proficient with modern skills and gives birth to a scientific society (Margot & Kettler, 2019).

The presentation of STEM education in Pakistani educational institutions is a little new. Maximum students considered it difficult and painstaking subjects; Science (Iqbal et al., 2009), Technology (Brewer et al., 2006), Engineering (Barreiro & Bozutti, 2017), and Mathematics (Schreffler et al., 2019). Institutions are playing a huge role in spreading STEM education but in Pakistani institutions case is alarming. The state attained 46% literacy rate among them whereas 5% for STEM education. The world is continuously changing, and stakeholders are making innovations in every walk of life but, STEM education is less fulfilling the demands of the state. Pakistani educational institutions are smoothly working in implementing education among students enrolled in public and private institutions since independence. Divisions and the spreading of diversity in education are alarming situations for the smooth running of the state (Institute of Social and Policy Sciences, 2010). Private educational outlets are running from elite class families that are continuously owning well-paid and danger free business for themselves (Li et al., 2020) and focused on strengthening their economic conditions (Awan, 2011; Punjab Development Statistics, 2015) through applying STEM based approaches. They target elite class families, captured them through STEM vision, use multiple tools, then charge a huge amount to impart instructions through STEM education laying a diversity of supporting gadgets. Public sector educational institutions are deficient in infrastructure and physical facilities (Awan & Zia, 2015) and maximum targets to provide free of cost STEM education, enlightening the hearts and minds of deprived Pakistani students to cope with 21st century STEM learning.

The curriculum is an interrelated set of experiences under schools directions (Marsh & Willis, 2007), plans of achieving goals (Lee & Chue, 2013), learners experience (Kuo, et al., 2014), the field of study (Davis & Varma, 2008), programs occur in the classrooms (Wiles & Bondi, 2019) and is the vehicle of attaining education (Offorma, 2005). It states content, objectives, teaching-learning materials, and teaching methods (Talla, 2012). The curriculum has elusive, mysterious, confusing, and fragmentary characteristics (Ornstein & Hunkins, 2016), planned classrooms occurrences

(Wiles & Bondi, 2019), and concerned with planned instructions related to intended students achievements (Patil, 2014). National curriculum document, 2006 meets with the current curriculum focusing widespread aspects of teachers self-efficacious and locus of control used for implementing STEM education (Government of Pakistan, 2006). Teachers cognitive, social and, emotional attributes are beneficial for classroom management, allowing students to access information to increase their confidence in acquiring STEM education (Government of Pakistan, 2017). National curriculum document 2006 focuses on enhancing students confidence, curiosity, self-control, capacity to communicate, and cooperation (Government of Pakistan, 2017). It emphasizes applying teachers choices and decisions in classrooms focusing on their confidence, emotional and classroom management potentials for learning STEM education (Government of Pakistan, 2014). The national curriculum document provides guidelines to implement STEM education to overcome science deficiencies (Government of Pakistan, 2009) by applying teachers self-efficacy, locus of control, and emotional labour through implementing STEM education.

Statement of the Problem

Teachers confidence, classroom management beliefs, emotions and, national curriculum document are essential factor that eagerly promotes students concerns towards STEM education. Self-efficacy locus of control, emotional laboured, and national curriculum document is considered deep-rooted and widespread constructs that have a significant effect on implementing STEM education. They promote students complex learning and update teachers focus towards inquirer, significant contributor towards STEM curriculum development, enhance collaboration and negotiator abilities (Slavit et al., 2016). Teachers provide an attractive environment to engage students (Casad et al., 2019), applying their cognitive, social attributes and emotional attributes (DeCoito & Myszkal, 2018; Türk-Kurtça & Kocatürk, 2020) to make students engage in acquiring STEM education (Sheu et al., 2018). On the other hand, teachers taught science as a compulsory subject from grade one to middle level (Iqbal et al., 2009) that covers key areas of STEM education (Government of Pakistan, 2009). There is a dilemma among students understanding of STEM education. The application of STEM education is a weak feature in Pakistan. When it is less implemented in its real spirit, it imparts several gaps in its theory and practice. There is a gap between documented, and implemented curriculum (Choppin, 2009), focusing on teachers self-efficacy, locus of control, emotional laboured and curriculum concerns practised to implement STEM education. After reviewing of comprehensive literature, the researchers observed and found that social scientists make their contributions in gauging the influence of self-efficacy on STEM education (Chen et al., 2021; DeCoito & Myszkal, 2018; Falco & Summers, 2019), locus of control, and STEM education (Nallapothula et al., 2020; Türk-Kurtça & Kocatürk, 2020) but none of the study structured in emotional labour and STEM education. The current research was attempted to gauge the effect of teachers self-efficacy, locus of control, and emotional work practised to implement STEM education, focusing on national curriculum document 2006 guidelines/concerns. The ultimate purpose of the present research was to figure out current appealing situations happening in the male public sector primary schools of district Lahore, Punjab province of Pakistan.

Research Questions

The researchers constructed the following research questions

1. What is the effect of teachers self-efficacy, locus of control, emotional labour, and national curriculum document on implementing STEM Education?
2. To what extent factors of self-efficacy, locus of control, emotional labour, and national curriculum document concerns are affecting on implementing STEM education?
3. Is there any strength of association that exists between self-efficacy, locus of control, emotional labour, and national curriculum concerns in implementing STEM education?

RESEARCH METHODOLOGY

The current research was quantitative, leading to the positivists paradigm. Quantitative studies give insight into an accurate picture of everyday situations (Coe et al., 2021). The design of the current research was causal-comparative; *ex post facto* Latin word means after the fact. It is a non-experimental research design that identifies how independent variables affect on dependent variables (Baronov, 2021; Creswell, & Guetterman, 2018; Jhangiani et al., 2019).

The Population of the Research

The population is the common part of participants, objects, and things having common characteristics for the researchers interests. The population of the current research consisted of 38,586 male teachers working in 17,095 public sector rural and urban primary schools of District Lahore, administratively divided into Tehsil City, Shalimar, Raiwind, Model Town, and Cantt (Pakistan District Education Ranking, 2016). Government of the Punjab hires those male and female teachers who have minimum master degree in science/arts subjects with compulsory professional degree. The researchers selected only male teachers because here in Pakistani female teachers feel shy, fewer assist and poorly give data for research purpose (Hassan & Akbar, 2020; Hassan et al., 2021).

Sample

The sample is the representative part of the population that is being selected from respondents involving objects, items, and things for results (Frey, 2018) and helps the researchers in generalizing the findings of the research (Lunenburg & Ornstein, 2021). The sample of current research consisted of 530 teachers selected through random sampling; an important technique of probability sample that has fewer threats of favoritism/discrimination and seek representativeness from the population (Fraenkel et al., 2012; Mertler, 2021) applying DIY and Hotjar's quantitative research calculating sample size formula.

Instrumentations

The authors finalized data collection by using research instruments that is a crucial device used to obtain respondents perception (Hinojosa-Pareja et al., 2021) Questionnaire is a deep-seated and helpful tool for getting data (Keenan et al., 2021). The researchers administered one questionnaire having five parts to collect the data from the respondents: **Part A:** Henson (1999) *Sources of Self-efficacy Inventory*; SOSI categorized in 4-factors; mastery experience; 9-items, vicarious experience; 9-items, social/verbal persuasion; 10-items and emotional/physical state consisted of 7-items having 5-point Likert type options. SOSI is the best predictor to measure teachers cognitive beliefs for required purposes (Cansiz & Cansiz, 2019; Mohamadi & Asadzadeh, 2012). **Part B:** consisted of *Rose and Medway* (1981) *Teachers Locus of Control Scale*; TLOC having 28-items mode of dichotomous options; 14-items are constructed to gauge teachers classrooms internal beliefs while, 14-items were constructed to measure teachers classroom external beliefs, already used in other studies (Hassan et al., 2021; Mastrothanasis et al., 2021; Nejati & Sahrapour, 2020). **Part C:** consisted of *Çukur (2009) Teacher Emotional Labour Scale* consisted of 4-subfactors surface acting, deep acting, emotional regulations, and emotional termination/deviance. Scale is validated and globally used to measure teachers emotions practised in classrooms. **Part D:** The researchers adapted Nistor et al. (2018) *The Teacher Questionnaire on STEM Education Practices* supported by Scientix and Texas Instruments Education Technology; developed by EUN partnership AIBL in connection with Deloitte SAS. Moreover, *The Teacher Questionnaire on STEM Education Practices* consisted of 6-subfactors; application of pedagogical approaches; 12-items, the relevance of latest material; 16-items, teaching-learning STEM with/without ICT; 21-items, teachers concerns on STEM education; 11-items, the impact of STEM on students learning; 9-items and **Part E:** consisted of self-constructed questionnaire based on national curriculum document 2006 guidelines on STEM education having of 7-items, mode of Likert type options.

Pilot Study

The researchers piloted questionnaire to ensure instruments reliability (Bateson & Martin, 2021; Doody & Doody, 2015). The researchers piloted instruments on a sample of 10-30% participants to ensure Cronbach's Alpha Reliability Statistics. The data obtained from pilot studies were not employed in the final results. The researchers themselves collected the data and entered it in SPSS to calculate Cronbach's Alpha Reliability Statistics. The researchers ensured reliability of self-efficacy scale .830, locus of control .867, teachers emotional labour scale .837, teachers questionnaire on STEM education .819 and questionnaire on national curriculum document 2006 guidelines .867 respectively. After ensuring reliability, the researchers collected final data collection from schools students, ensuring ethical considerations; informed consent, confidentiality, anonymity, and no physical and physical harm in case of respondents volunteer participation (Larsson et al., 2021; Mertler, 2021; Schweigert, 2021; Zina, 2021).

Research Results

The research results underpin the psychological effect of teachers self-efficacy, locus of control, emotional labour, and national curriculum document 2006 based concerns/guidelines which were gauged through applying regression analysis techniques and *Pearson Product Moment Correlation (r)* in SPSS.

Table 1: Effect of self-efficacy, locus of control, emotional labour, and national curriculum document 2006 concerns on implementing STEM education

No	*Teachers attributes*	*F*	*R*	R^2	*B*	*SE*	*β*	*t*	*p*
1	STEM Education (Constant)				2.727	5.953		.458	.01
2	Self-efficacy	2559.134	.910[a]	.829	1.082	7.676	.910	50.588	.01
3	Locus of control	1008.004	.810[a]	.656	.379	10.882	.810	31.749	.01
4	Emotional labour	1262.066	.840[a]	.705	.063	4.002	.840	35.526	.01
5	Curriculum concern	206.545	.530[a]	.281	2.948	15.736	.530	14.372	.01

Note: $R = .773$, $R^2 = .618$, $\beta = 1.12$; (F (4, 526) = 1258.937, $p < .05^a$)

As delineated in Table 1, the researchers run multiple regressions analysis that yielded .618 value of R^2 having 61.80% explained observations were seen with construction of significant equation (F (4, 526) = 1258.937, $p < .05$) structuring regression co-efficient ($\beta = 1.112$) whereas value of independent sample t-test, $t(528) = .458$, $p < .05$ was significant predictor on implementing STEM education. Interpretation further reports self-efficacy having .829 value of R^2 with 82.90% explained variations were seen with regression co-efficient ($\beta = .910$); locus of control possessed .656 value of R^2 with 65.60% explained variations were seen with regression coefficient ($\beta = .810$); emotional labour contain .705

value of R^2 with 70.50% explained variations were seen with regression co-efficient (β = .840) and teachers curriculum based concerns stating .281 value of R^2 considering 28.10% explained variations were reported with regression coefficient (β = .530). Ascertaining results of regression coefficient, interpretation of independent sample t-test described that self-efficacy, $t(528) = 50.588$, $p < .01$, locus of control, $t(528) = 31.749$, $p < .01$, emotional labour, $t(528) = 35.526$, $p < .05$ and teachers curriculum based concerns, $t(528) = 14.372$, $p < .01$ were significant predictors on implementing STEM education. Estimations in implementing STEM education were equal to 2.727+1.082+.379+.063+2.948 scores. It is concluded that students concerns towards STEM education were increased 4.432 scores when applied teachers cognitive, social, emotional and curriculum based concerns on students in classroom during teaching.

Table 2: Factors of self-efficacy, locus of control, emotional labour, and curriculum base concerns affecting on implementing STEM education

Sr.	***Factors***	***B***	***SE***	***β***	***t***	***p***
1	STEM (Constant)	79.299	3.351		29.25	.01
2 Self-efficacy	Mastery experience	2.63	.105	.737	25.08	.01
	Vicarious experience	3.01	.098	.799	30.54	.01
	Social/verbal persuasion	3.31	.097	.830	34.14	.01
	Emotional/physical state	5.41	.134	.869	40.44	.01
3 Locus of control	Internal locus of control	3.38	.106	.810	31.75	.01
	External locus of control	2.95	.205	.530	14.37	.01
4 Emotional labour	Surface acting	.264	.006	.888	44.45	.01
	Deep surfing	.257	.007	.859	38.55	.01
	Express naturally emotions	.241	.007	.815	32.32	.01
	Emotion termination	.223	.008	.754	26.38	.01
5 Curriculum-based concerns	Pedagogical approaches	3.81	.151	.740	25.28	.01
	Latest material	4.44	.270	.582	16.46	.01
	Teaching with STEM	1.81	.084	.687	21.70	.01
	Teachers concerns on STEM	2.40	.049	.904	48.58	.01
	Impact on students learning	2.18	.078	.774	28.06	.01

Note: $R = .751$, $R^2 = .576$, $\beta = .751$, (F (15, 515) = 918.61, $p < .05^a$)

As established in Table 2, the authors run multiple regressions which yielded construction of significant equation (F (15, 515) = 918.61, $p < .05$) having .576 value of R^2 with 57.60% increased variations were seen focusing standardized regression coefficient (β = .751). Results further declared value of standardized regression coefficient on factors of self-efficacy: mastery experience (β = .737), vicarious experience (β =.799), social/verbal persuasion (β = .830), emotional/physical state (β = .869), factors of locus of control: internal (β = .810), external (β = .530), factors of emotional labour: surface acting (β = .888), deep acting (β = .859), expression of naturally felt emotions (β = .815), emotion termination (β = .754) and factors of national curriculum based concerns: pedagogical approaches (β = .740), latest material (β = .582), teaching with STEM (β = .687), teachers concerns on STEM (β = .904), impact on students learning (β = .774) and teachers curriculum based concerns (β = .530). Ascertaining the results of regression coefficient, interpretation of independent samples t-test yield that mastery experience, $t(528) = 25.08$, $p < .01$, vicarious experience, $t(528) = 30.54$, $p < .01$, social/verbal persuasion, $t(528) = 34.14$, $p < .01$, emotional/physical state, $t(528) = 40.44$, $p < .01$, internals, $t(528) = 31.75$, $p < .01$, externals, $t(528) = 14.37$, $p < .01$, surface acting, $t(528) = 44.45$, $p < .01$, deep surfing, $t(528) = 38.545$, $p < .01$, express naturally emotions, $t(528) = 32.321$, emotion termination, $t(528) = 26.384$, $p < .01$, pedagogical approaches, $t(528) = 25.28$, $p < .01$, latest material, $t(528) = 16.46$, $p < .01$, teaching with STEM, $t(528) = 21.70$, $p < .01$, teachers concerns on STEM, $t(528) = 48.58$, $p < .01$ and impact on students learning, $t(528) = 28.06$, $p < .01$ were major predictors on implementing STEM education. Predictions on implementing STEM education were equal to 79.299+2.63+3.01+3.31+5.41+3.38+.264+.257+.241+.223+3.81+4.44+1.81+2.40+2.18 score scores whereas teachers self-efficacy, locus of control, emotional labour and curriculum based concerns were observed in classrooms during teaching learning process. It is concluded that students concerns towards STEM education were increased 36.315 scores through applying teachers cognitive, social, emotional and curriculum based concerns in classrooms.

Table 3: Measure the strength of association among self-efficacy, locus of control, emotional labour, and curriculum concerns on implementing STEM education

Factors	***M***	***SD***	***STEM***	***1***	***2***	***3***	***4***
STEM Education	156.82	18.54	-				
1. self-efficacy	126.29	15.61	.910**	-			
2. Locus of control	21.68	4.45	.810**	.873**	-		
3. Emotional labour	11.31	6.62	.002	.022	.840**	-	
4. Curriculum concerns	156.82	18.54	1.000**	.910**	.810**	.002	-
**. Correlation is significant at the .01 level (2-tailed).							

As established in Table 3, the researchers applied *Pearson Product Moment Correlation (r)* to measure the strength of association among teachers self-efficacy, locus of control, emotional labour and curriculum concerns on implementing STEM education. Interpretation reveals significant strong relationship between: self-efficacy and STEM education (r = .910**, n = 528, p < .05), locus of control and STEM education (r = .873**, n = 528, p < .05), emotional labour and STEM education (r = .840**, n = 528, p < .05) and exist a significant and weak association between teachers curriculum cancers on implementing STEM education (r = .002**, n = 528, p < .05). It is concluded that effective use of independent variables; self-efficacy, locus of control, emotional labour and curriculum concerns strongly correlate with/enhance use/understanding of dependent variable; STEM education

DISCUSSION

Students are regularly displaying maladaptive actions; insufficient attention, slowness, and aggression towards authorities. Intellectuals take initiatives and, their continuous efforts confirmed fruitful results in the form of attribution theory, expectancy theory, goal theory, self-determination theory, self-concept, and self-efficacy theories (Schunk & DiBenedetto, 2020; Nemer et al., 2019). Self-efficacy directly affects one's tangible practices, feeling, selection of activities, the quantity of struggle and effort inserted into activities (Grigg et al., 2018; Guntern et al., 2017; Huang et al., 2019; Sciuchetti & Yssel, 2019; Shaukat et al., 2019; Talsma et al., 2018). Results of the current study established that teachers self-efficacy affect 82.90% on implementing STEM education that supports the findings of Srikoom and Faikhamta (2018), who reported that teachers self-efficacy significantly effect on implementing STEM education. Self-efficacious teachers have more confidence in their cognitive abilities towards implementing STEM education (Maeng et al., 2020; Rahmadi et al., 2020). Results of current research congruent with the findings of the studies conducted in the USA (Wang et al., 2011), UK (Morgan & Kirby, 2016), Australia (Office of the Chief Scientist, 2013) and in Canada (DeCoito, 2016a), which reveals that teachers confident play an imperative role in implementing students potential towards implementing STEM education (Sanders, 2009).

Locus of control is burning construct that capable teachers to arouse students thirst towards effectual learning (Sembiring & Purba, 2019). Individuals success is clutches by applying fundamental construct; locus of control in daily life applications (Chaudry et al., 2019; Hassan & Akbar, 2020). Results of current research established that teachers locus of control effect 65.60% on implementing STEM education that supports the findings of Clark and Peterson (1986), which revealed that teachers locus of control is the best predictor on controlling classroom organization for effective STEM education. Locus of control is termed as *the filter and amplifies* that monitor teachers capabilities and interpret their behavioural practices in classrooms for practical STEM durability (Berry et al., 2015). Association between teachers locus of control is a complicated issue; fewer implement practices to reflect their beliefs (Srikoom & Faikhamta, 2018). It is one of the unbelievable facts that with time, STEM education is taking more concentration among stakeholders in South Africa (Naidoo & Singh-Pillay, 2020), in Turkey (Büyükdede & Tanel, 2019) in Malaysia (Fadzil et al., 2019), in Thailand (Srikoom & Faikhamta, 2018) in USA (Li et al., 2020) and in Pakistan (Hali et al., 2021).

Emotional labour is the application of emotions and feelings in the workplace. Workers entirely indulged themselves in acquiring required objectives (Grandey & Gabriel, 2015; Mallory & Rupp, 2016). Teachers are the prominent stature of educational institutions which impart instructions among students focusing their emotional labour on enhancing students performance (Rajak et al., 2021). Understanding and applications of teachers learning experience in new situations through regulating and expressing their internal feeling fortify students social and educational success (Burić, 2019). Findings of the current research revealed that teachers working in Pakistani primary sector public schools play their 70.50% role in implementing STEM educations. They have full potential to interpret their motions about context. Focusing on the worth of emotional labour, the researchers make significant contributions in diverse aspects of emotional labour with various variables: workplace spirituality and well-beings (Zou & Dahling, 2017), emotional intelligence (Austin et al., 2008), spirituality/religious (Byrne et al., 2011), work threats (Grandey et al., 2015), students absenteeism (Nguyen et al., 2016) and employees performance (Walsh et al., 2016). These researches significantly contributed to the existing body of knowledge, theoretical improvement of emotional labour, its conception, and approaches focusing on quantitative research paradigm and other dimensions as well.

Curriculum interrelated set of experiences and plans for students under the institutional direction (Marsh & Willis, 2007), planned occurrence in classroom (Neuman & Danielson, 2021), dynamic program that concentrates on societal need and wants (Deng, 2021), a vehicle of attaining education (Offorma, 2005) focusing essential parts of STEM education as well. The purpose of the state is to produce inhabitants having keen concerns in scientific and technological application (Jamieson-Proctor et al., 2006; Thompson, 2013), logical reasoning, critical thinking, and problem-solving skills (Kuo et al., 2014). Results of the current research ascertained that teachers have only 28.10% awareness of national curriculum document to follow guidelines on implementing STEM education. The national curriculum document 2006 addresses three fundamental fields of study; life science; earth science, and physical and space sciences which develop students STEM understanding (Government of Pakistan, 2006). National Curriculum document targets to prepare students for long-life learning to equip them with the language competencies incorporated in the document (Government of Pakistan, 2017). The national curriculum document 2006 focused on textbooks, teacher guide, teaching methods, assessment techniques, ICT, and the application of innovative technical gadgets (Government of Pakistan, 2017). It is revealed that all the components of the curriculum judged as to their mutual integration (McClellan, 2021).

CONCLUSIONS

Teachers invest their cognitive, social, emotional, and curriculum concerns to impart instructions among students to promote education/STEM education. Teachers focus on students understanding of STEM education. It is one of the factors that teachers potential significantly influences students learning and arouses understanding. The Current research concludes that the main hindrance in less following national curriculum document-based guidelines is officials slackness. Officials always pointed guns towards sub-ordinates for desired results neglecting ground realities, instead of removing barriers faced by headteachers, teachers, and students in institutions in implementing STEM education.

LIMITATIONS AND STUDY FORWARD

The authors limited current research on public sector male primary schools of district Lahore focusing quantitative leading to positivists paradigm. However, this research is extended to public and private sectors male and female primary schools teachers working in rural and urban areas of 36-districts, including district Lahore. Future researchers may conduct studies focusing on qualitative and mix method designs to explore current practices happening in public sector schools to implement STEM Education. Moreover, professional organizations may train public sector teachers focusing on an aspect of cognitive, social, emotional labour and national curriculum based concerns about STEM education, as teachers educate students with toil and drudge to enhance their understanding of STEM Education.

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