

## **The Intellectual Roots of Reflective Practices in Ancient Gandhāra: Implications on Contemporary Teacher Education in Pakistan**

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### **Abstract**

*The major focus of this study is to trace the intellectual roots of reflective practices in ancient Gandhāra education system and to determine its implications on modern teacher education in Pakistan. The research relies heavily on review and critical analysis of Gandhāra scriptures, classical and modern literature about reflective practices in teacher education. It comprises of three parts, namely/that is., theoretical framework of reflective practices, reflective practices in Gandhāra (Ancient Pakistan), and its implications on modern teacher education in Pakistan. The first part operationalizes the reflective practices in terms of classic and modern theories, as presented by Aristotle, John Dewey, Schön and others. The second part of the paper sorts out the intellectual roots of reflective practices in Pre-Buddhist (Vedic and Upaniṣad-15<sup>th</sup>-8<sup>th</sup> century), and Buddhist (1<sup>st</sup>-4<sup>th</sup> century CE) literature of Gandhāra. The last part of the paper discusses the past practices of teacher education (post colonial period, since 1947), and also details the current reflective practices in newly introduced Four Years B. Ed (Hons.) program in Pakistan. The major conclusions of the study establish the importance of reflective practices, their practical efficacy, exchanging traditional delivery methods with active and independent learning, re-orientation towards reflective paradigm, testing of the educational theories with respect to classroom practices, understanding our indigenous education system in order to create a community of independent critical thinkers and national identity into modern teacher education of Pakistan.*

**Keywords:** Intellectual roots, Reflective practices, Gandhāra education, Teacher education, Four years' B. Ed (Hons.)

### **1. Introduction**

The modern as well as the classic educationists of the Western world and the Gandhāra civilization have placed enormous importance on reflective practices in teacher education. Reflective practice is an exploratory, purposeful, creative pursuit for better knowledge and understanding, and to look systematically and rigorously at one's own practices (Rolfe, Freshwater & Jasper, 2001). It is a process of self enquiry which helps teachers to enhance their positive emotions, and resolve problems. It also enhances teachers' capacity to intervene, interpret, and act positively on significant questions in their teaching career. Reflection also relates to the notion of learning and thinking. It acts as a catalyst for learning and the students' response to their learning (Johns, 2002; Moon, 2004). Reflective practice is also interpreted as a dialogue that improves teachers' professional development (Laughlin and Hanifin, 1995). The dialogue helps one to understand one's own perspective in relation to those of others and therefore, transforms knowledge and helps to resolve complex conditions and conflicts (Ramchand, *n.d.*). Reflective practices help teachers to construct their practical knowledge around students' needs. A reflective teacher is capable of constant self appraisal and professional development. As a result, they are open to new ideas and multiple solutions to a problem. Such teachers (possess ability to) make independent decisions. A reflective teacher combines enquiry and implementation skills with open mindedness. Reflective practices provide richer and informed pedagogical experiences for both teacher and the student. The critical analysis helps teachers to understand the relationship between school and the larger society (Ramchand, *n.d.*). It helps teachers to understand gaps between theory and practice, and make connections with real classroom contexts. A reflective teacher not only imparts information written in textbooks and other policy documents but also searches for its relevance with socio-political and morals of the local environment.

## 2. The Theoretical Framework of Reflective Practice in Teacher Education

Historically, Aristotle used the word '*theoria dimension*' which is translated as 'reflection'. It means "on what is done", which leads to further action. The critical theorists of early twentieth century define 'reflection' as the genesis of one's present consciousness, done by critical reasoning. While according to the Frankfurt School of 1940s, it was the intellectual attainment of the mind. John Dewey also mentioned that problems are solved only through reflective practices in education. He is generally considered as a pioneering figure for introducing the idea of a teacher as a reflective practitioner in 19<sup>th</sup> century. He defined reflective thought as an active, persistent and careful consideration of any belief in light of new knowledge. John Dewey (1933) considered reflective practice a crucial element for the professional development of a teacher. Such professional development is closely related with 'experience'. A reflective practitioner uses experience as a raw material for learning. He defines three attitudes as pre-requisites for reflective teaching, i.e., open mindedness, responsibility, and whole heartedness. These attitudes plus the enquiry and problem solving skills make a reflective teacher. He did not believe in pre-judgment in the light of already existing traditions, but conclusions reached on basis of observing, collecting, and examining evidence. Dewey was of the opinion that people were able to discover true layout of the solar system, the Laws of Motion, and also new methods of enquiry in education in seventeenth century. Therefore, he asserted that reflective practices became more common in seventeenth century onwards and followed more by modern people as compared to the ancient people (Boydston, 2008).

Schön (1983) is another important figure in developing the idea of reflection-IN-action and reflection-ON-practice. Reflection-IN-action refers to reflection in a particular context or workplace. It also refers to thinking on what you are doing and making adjustments on spot. Reflection-ON-practice refers to reflecting after the event, i.e., looking back and going over things again and a rapid interpretation of the situation, where rapid decisions are required. Knowledge is an important element of a reflective practitioner (Schön, 1987). A reflective practitioner reflects on what he/she does and on his/her own teaching and experience. This reflection generates a rich and detailed knowledge base derived from practice. Reflection also improves the future actions. Schön believed that professionals who are encouraged to think carefully about what they do, while they do it, learn in more profound ways. Another important dimension of reflective practice is its relationship with professional knowledge and practice. Self reflection and dialogue are also central to reflective practices (Ramchand, *n.d.*). However, in ancient and indigenous traditions of Pakistan, the teacher was supposed to be committed to the growth of students. There is a long history of dialogue in ancient literature of Gandhāra. The preferred method of teaching in *Vedic Upaniṣad*, and Buddhist Period was through a gradation of questions and answers.

## 3. The Indigenous Basis of Reflective Practice in Ancient Pakistan (Gandhāra)

The University Centre of Taxila was a celebrated intellectual center. It was at its cultural peak since eighth century BCE. Nonetheless, the term University Center of Taxila refers to segregated schools, run by renowned teachers, who specialized in their own areas of expertise. Gandhāra remained a cradle of important innovative and revolutionary movements, especially education, since the *Vedic* Period. Some important Pre-Buddhist treatises were possibly originally written in Gandhāra, e.g., some oldest *Upaniṣads* and Kautilya *Arthaśāstra*. The scriptures were later on rewritten, edited, or additions were made during the Gupta Period. The Chinese and other literary sources highlight the educational role of the ancient Gandhāra educational centers of Taxila, Kaśmir, Peshawar, and Swat Valley. China possesses a complete Buddhist Canon, translated from Gandhāri Prakrit, largely taken by monks travelling from Gandhāra to China. The Pre-Buddhist and Buddhist scriptures provided clues to the courses of study and structure of education system in Gandhāra monasteries. Gandhāra scriptures provide clues to use of advanced teaching methodologies, *viz.*, dialogue and debate, critical analysis, reasoning, and logic. The Gandhāra education system firmly based on Buddhist culture thrived for several centuries. The Māhayāna order of Buddhism gave a new impetus to the education of monks and the laity. However, it particularly paid attention to the behavior code and the highest intellectual ability of monks- the teachers, who could in turn train common people for development of the society.

The didactic and pedagogical component of the *Upaniṣads* are comparable to the classic and the modern concepts of 'reflective practices and enquiry' in education. A majority of the *Upaniṣads* were in the form of dialogue. However, the earliest mention of *shravana* (listening to one's teacher) refers to *menana* (the content) and *nididhyasana* (reflection on what was listened) in the *Upaniṣads* (Astley & Leslie, 1994; Easwaren & Micheal, 2007; Reagon, 2005).

The political treatises of Kautilya, practically implied by the Mauryans, actually mimicked the political administration of Gandhāra, initiated by Achaemenids in third century BCE (Prakash, 1976). The Pali chronicles claim Kautilya, a resident of Taxila. Others think that he was a native of the country surrounding the River Kutilā or Sarasvati (Shendge, 1977). Kautilya *Arthaśāstra* mentions that process of learning includes the qualities of intellect, desire, ability to learn, listen, grasp ideas, retain information, reject false views, and adhere to the true ones (i.e., critical analysis and reasoning), and reflect on it (Rangarajan, 1992).

The term ‘reason’ is defined as a rational element of human intelligence distinguished from sensual or emotional element. It leads to freedom of thinking and action (Dales, 2003; Jinananda, 2009). Aristotle argued that the characteristic that distinguishes human beings from all other entities is their ability to reason. It is natural for human beings to use their natural cognitive ability to reason. Aristotle used the term contemplation; an ability to reason from previous experiences and creating future course of action. Humans become dull and unhappy when they lose their ability to reason. Contemplation leads to practical wisdom and responsibility towards other human beings. However, Aristotle (1985) mentioned that the socio-historical experiences sometimes steal the humans’ ability of contemplation. Nonetheless, reasoning and critical analysis comprised an integral part of the Pre-Buddhists as well as Buddhist education system in Gandhāra. Kautilya *Arthaśāstra* enumerates the term *Anviksiki* referring to the science of testing the perceptual and scriptural knowledge by further scrutiny (Dasgupta, 1922). The Buddha’s life history reveals that his search for truth started with observable and common features of human experiences. Instruction is important to attain knowledge, but it should be corroborated by personal experience, suitable training and development of one’s intellectual and moral powers. According to Buddha, one must not accept his Dharma from reverence, but should try it first as gold was tried by fire (Narasu, 1948). Furthermore, the ethics should be integrated with rational investigation of the human nature, social organization, and the physical world. Early Buddhist teachers instigated the spirit of enquiry and rational investigation through dialectical thinking and critical social analysis (Gautam, 2009; Hamilton, 2000). According to *Kālāma Sūtra* and *Angūttara Nikāya*, the Buddha taught to Kālāma princes that they should not believe in a tradition due to its antiquity or its popularity, rather they should analyze it and verify it against its significance to the human beings. *Kālāma Sūtra* advised the followers of Buddhism not to accept any moral code on the basis of ten grounds, i.e., **1) vedic authority (Sanskrit (Sk): Anussava) 2) tradition (Sk: Paramparae) 3) report (Sk: Itikīrae) 4) textual authority (Sk: Pittakasampadae) 5) apparent agreeability of the view (Sk: Samano garu) 6) authority of the holder of the view (Sk: Takkahetu) 7) apparent logicity of the view (Sk: Nayahetu) 8) the fact that the view is an accepted stand point (Sk: Aakaaraparivitakka) 9) inadequate reflection on reason (Sk: Bhabbaruupataa), and 10) the fact that the view agrees with one’s own view (Gautam, 2009). The *Madhyameka* Philosophy of Nāgarjūna<sup>1</sup> especially puts high value on critical investigation (Jinananda, 2009; Mittal, 2009; Vose, 2010).**

Nāgarjūna quotes the notion of ‘knowing’ or ‘belief’ with critical analysis and relates the mechanics of inference to belief in most scientific manner. According to Nāgarjūna Middle Treatise 24 a<sub>27</sub> and 24b<sub>3</sub> (as cited in Bocking, 1995), belief or knowing is of four types, i.e., 1) manifestations of the things (Sk: Pratyaksa) 2) comparative knowledge (Sk: Anumāna) 3) analogy (Sk: Upamāna) and (4) the statements of the holy ones (Sk: Śabada).

Gandhāra *Jatakas*<sup>2</sup> were potent means to educate people. The literary and Palaeographic evidence reveals that *Jataka* were formally taught in Gandhāra monasteries (Salamon, 1999). The *Jataka* stories further elaborate the idea and teach that every piece of information should be tested and examined before its acceptance as a truth. For instance, Daddhabha *Jataka* (IV.322) maintains that one should not listen to the idle gossip and jump on conclusions hastily (Cowell, 2002).

<sup>1</sup> The Nāgarjūna’s provenance and his dates are widely disputed among the scholars. Nāgarjūna’s biographies were written and re-written and translated from Prakrit and Sanskrit throughout the Indian subcontinent, China and Tibet for about a thousand years with fervour and high reverence. He was a living legend throughout the history of Māhayāna Buddhism and every Buddhist centre in the Indian Subcontinent seems to be claiming to have owned him as a resident of their area. Tāranatha and Buston locate early Māhayāna to Andhra Pradesh; however, Etienne Lamotte (the pioneer translator of Nāgarjūna’s philosophy in a Western language) mentions that the connection of South India with Nāgarjūna is scientifically and logically incorrect. He believes in the Kulhana’s Rājataranginī placement of Nāgarjūna in Kaśmir. Kulhana mentions Nāgarjūna as living at *Sadarhadvana* during the reign of Huśka, Juśka or Kaniśka. Stein identified *Sadarhadvana* with the modern village of Harvan, near Srinagar (as cited in Walser, 2005). Fatone (1981) also rejects the legendary placement of Nāgarjūna at Nalanda, and maintained that he belonged to a much earlier period than the prime days of Nalanda University (Jawad, 2013).

<sup>2</sup> Jatakas were Buddhist legends and lore.

Dialogue and debate were considered as means of imparting true education in Pre-Buddhist and Buddhist education system of Gandhāra. Historically, Socrates (c. 470-399 BCE) is generally described as the ‘father’ of the method of enquiry called as ‘dialectics’ or ‘dialogue’ or logical discussion in education (Spring, 1994). The 19<sup>th</sup> and 20<sup>th</sup> century educationalists have variously emphasized the practical implications of the Socrates’ dialectic in education, highlighting that belief without reason and judgment was merely a prejudice (for instance see Sumner, 1906). Socratically, the students explored the evidence that could test their assumption - an enquiry method leading to analytic and critical thinking. Nonetheless, the shaping of one’s character, through the critical use of reasoning was considered as the basis in ancient education system of Gandhāra. Critical reasoning was supposed to compel people out of their apathy, and become compassionate towards others. The early *Upaniśads* consist of dialogue and debate in formal teachings by famous teachers of the time (Ramchand, *n.d.*). Dialogue implied that human mind was not an empty vessel into which the teacher poured knowledge. It was believed that truth lies within each person and the role of dialogue was to help the individual discover truth within him. The teacher did not give complete answers. He rather asked questions that led to discovery of correct answer. In a dialogue, the individual became thinking participant in search of knowledge through cross examination. The teacher induced his partner to explain and justify his opinions through reason. Dialogue was meant for students to learn from each other, and to improve each others’ knowledge. It implied, further, that human mind could and should make rational choices. Therefore, the instruction did not mean to tell complete answer but to help the students see real objects themselves. The dialogues compelled the individual to play an active role in acquiring ideals and values by which he was to live (Perry, 1990). Reasoning is a logical knowledge that regulates our daily lives. *Tarka* was process of reasoning carried on in one’s mind before one can come to any right conclusion, a subjective weighing of different alternatives on the occasion of a doubt before a conclusive affirmation or denial (Kapoor, 2003). *Bodhisattvas*<sup>3</sup> avoid one-sided views in order to attain enlightenment. The world of particulars is devoid of mind, will and intelligence, but human beings possess these powers of intellect and reasoning.

I-Ching<sup>4</sup> places Māhayānists the highest in the class of dialectics and logicians. The school of dialectics/debates was greatly developed by Nāgarjūna. The *Prajna* texts follow a format of continuous dialogue between the Buddha and his disciples, as well as between gods, spirits and men. In his *Upayakarśalya-hrdaya Sūtra* (The Essence of the Skills in the Accomplishment of Action) he describes at length the rules of dialogue and dialectics, viz, the perfect and the defected speech, the rules of perfect perception, inference and comparison, the analogues, the kinds of analogues, the kinds of examples that the disputant and the respondent should provide. The conclusions might be drawn by means of inference, comparison, scripture or perception (Potter, 2003). According to *Lankavatara Sūtra* of Nāgarjūna, the higher power of reasoning consists of search through, examine thoroughly and the intelligence that sets up all kinds of distinctions over a world of appearances attaching the mind to them as real. In Gandhāra relief *vitarka mudra*<sup>5</sup> symbolizes the action of argument or discussion. It is also called as the action of explanation (Frédéric, *n.d.*; Prebish, 1994). Nonetheless, the teacher education in Pakistan remained devoid of reflective practices, in spite of such rich cultural background in eclectic thinking, critical analysis, logic, dialogue, and interpretations. The major reason behind this apathy was break down of indigenous education systems during British Colonial Period and lack of modern research in indigenous education system of Pakistan. Therefore, the contribution of several intellectual, innovatory, and philosophical movements is poorly understood by modern educationists and the research students in Pakistan.

#### **4. The Current Reflective Practices in Teacher Education in Pakistan**

The formal education and teacher education in Pakistan remained a (British) Colonial legacy for several decades after its birth in 1947. PTC (Primary Teachers’ Certificate), CT (Certificate of Teaching), and B. Ed. programs were based on nineteenth century Normal School models, whose curriculum relied heavily on reading, writing, arithmetic, and spelling. To make matters worse, these skills were transformed through delivery methods which made students passive recipient of information. Such delivery methods did not comply with International standards of professional teachers’ development. The mere reproduction of the teacher- and text-based materials could not produce an active community of learners, who could contribute to development of their society (Butt, 2008).

<sup>3</sup> In Buddhism, bodhisattva is either an enlightened (*bodhi*) being (*sattva*), or an enlightened being.

<sup>4</sup> 7<sup>th</sup> century CE Chinese Buddhist pilgrim to the Indian Subcontinent.

<sup>5</sup> A *mudrā* is a symbolic or ritual gesture in Hinduism and Buddhism

Pakistan faced an overwhelming task of providing a large number of primary and secondary teachers at its onset. Therefore, the teacher education colleges remained focused on fulfilling demands for higher number of teachers in primary and secondary schools. The number of teachers increased over time. Nonetheless, the average teacher-to-student ratio remained 1:38 till 2008, as compared to internationally recognized optimal ratio of 1:25 (Butt, 2008). The National Education policies also announced initiatives which would attract more number of teachers towards the profession of teaching in schools (Huma, 2013). Consequently, the teacher education programs remained focused on skill development of the prospective teachers (Huma, 2013). Rather than promoting enquiry, critical thinking or reflective practices among prospective teachers, they endorsed rote learning and unquestionable acceptance of textual materials (Butt, 2008). The text-oriented examination system also left little room for critical thinking.

Traditionally, the teacher education was not standardized. The teacher education programs offered a wide scheme of study for PTC, and CT, B. Ed and M. Ed in four provinces of Pakistan. It also differed in public and private teacher education colleges, universities, and formal and non-formal (Open and Distance) systems of education. Pakistan as a developing country needs to develop its education standards according to International requirements for standardization and globalization. Ministry of Education, in collaboration with UNESCO and financial support of USAID, developed the National Professional Standards for Teachers in Pakistan (USAID, 2009). The National Standards were developed in response to urgency of quality teachers and quality education. In 2008, the existing PTC, CT, and one year B. Ed programs were proposed to be replaced by four years B.Ed (Hons.) programs, with standardized curriculum for all provinces of Pakistan. The curriculum for this program was prepared by Higher Education Commission (HEC) in collaboration with USAID funded TEP (Teacher Education Program, former Pre-STEP Pre-Service Teacher Education in Pakistan), in close consultation with public sector universities, teacher education colleges and other institutions all over Pakistan.

The Professional Development Standards for Teachers in Pakistan articulated the dire need of reflective thinking and practice, both individually as well as in groups, as a quality indicator of curriculum design and development for teacher education programs. The professional reflection should be an ongoing process in refining teaching practices throughout the career of a teacher. Hence, the standards included important elements of reflective thinking, i.e., dealing with individual differences and diverse styles of learning among students and to plan instructional strategies according to the classroom, school, culture and community needs, are important elements of the standards. It calls for a higher level of sensitivity to cultural, linguistic, gender and social differences among students. The formal education system in Pakistan is diverse and multicultural, as the students being served in the four provinces of Pakistan possess different socio-economic and geographical contexts. Understanding diversity in classrooms and adjusting the curriculum accordingly is a pre-requisite standard of International teachers' training program (NCATE, 2008). The National Standards also highlighted the need of dialogue and discussion as a means to conflict resolution, tolerance and celebration of diversity for a knowledgeable teacher who understands Islamic ethics and values for a successful social life. Moreover, it elaborates the initiation of critical and creative thinking, problem solving, enquiry, and decision making skills; and also introducing most effective communication and questioning techniques among prospective teachers to stimulate critical thinking among their future students. It also speaks of the ability of the prospective teachers to evaluate teaching resources and curriculum materials for their completeness and usefulness for representing particular ideas and concepts (Butt, 2008).

In accordance with the National Professional Standards, the four years B. Ed (Hons.) focused on planning and carrying out an action research activity, engaging in courses like critical thinking and reflective practices to develop habit of enquiry into practice by the prospective teachers.

During present study the teachers' guide for Science I, 2012, for the newly introduced teachers' training program of ADE/B. Ed (Hons.) Elementary was selected as a model for content analysis of reflective practices, viz. critical thinking, dialogue and discussion/two way communication, open ended questions and enquiry, and reaching conclusions through critical analysis of the available information. The content analysis is a powerful data reduction technique, generally used for making inferences from the text (Stemler, 2001). It has remained most commonly used research method for past several decades, to empirically infer symbolic data trends in the textual materials (Milne & Adler, 1999). It is a systematic and replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Stemler, 2001). The present study employed "context units", to see if "commonalities exist" in the text (Khosrow-Pour, 2002, p. 26).

Furthermore, three types of coding units were used in the present study, i.e., word frequency count, phrases/questions posed in the text and the unit analysis. The word frequency count is based on explicit rules of coding, thus allowing us to discover and describe the focus of the text (Stemler, 1999). The major assumption was that the most often used words reflect the greatest concern or the potential interest of the authors. Though, generally speaking, the research studies dealing with large volumes of data/clusters use content analysis; still, the present study used content analysis for highlighting the focus of the course guide on reflective practices. It is expected that this humble opening will pave way for further detailed content analysis of the syllabi of courses of newly introduced four-years B. Ed. (Hons.) programs in Pakistan.

The course guide Science I, (Year 1, Semester 1) comprises six units, i.e., population and ecosystem; diversity, adaptations, and evolution; earth-the blue planet; force and motion; and properties of matter. The course guide enumerates question-answer, discussion, and investigation methods as these open up the students' minds to wide based enquiry methods, rather than just to read the text book and solve problems sets in which 'only one defined correct answer is teacher verified'. The course overview maintains that 'the students will gain essential pedagogical content knowledge through reflections and application of pedagogical science content knowledge...' (p.10). The course objectives further affirms recognizing common misconceptions, design appropriate remediation, and reflect on their teaching to develop a personal approach to teaching of science in elementary classrooms.

The guide book throughout the text heavily relies upon the terminologies directly related to reflective practices. i.e., 'investigate/explore (n=65), observe/vation/ing (n=46), thoughtful discussion/discuss (n=45), inquiry/inquiry based activities (n=24), recognize/ing misconceptions (n=22), open ended questions/questioned/query (n=17), critical thinking (n=11), and reflection/s (n=8), inferences (n=2), apply (n=3), record (n=3), two-way communication and challenge (n=2). These terminologies count for 242 out of 7000 words (3.4%) of the major text (excluding titles, subtitles, and references in the text).

The guide book also spells out seventy eight major open-ended questions in its units, starting with 'what, where, why and how'? While sixty nine minor questions are merged within the paragraphs. The open-ended questions do not have one right or wrong answer. These encourage discussion and dialogue, leading to personal opinions of the students based on prior knowledge, brain storming, and reasoning. The text advises the teacher to listen carefully and patiently to the students, without a speedy judgment on their opinions, and persuade them to discuss whether they agree or disagree to each other and why/how to revise their answers, and realize their mistake, if any. It also repeatedly advises the teachers to encourage the students for further thinking, reflections, acting, and exploration. The following paragraphs further elaborate the content analysis of each unit of the guide book in question.

Unit One, titled 'Course Introduction', speaks of enquiry approach with ample opportunities for hands on reflections on previous experiences of the student teachers, developing questions, observations, discussions, leading to debate in the classrooms. It speaks of the open ended questions that allows for various possible answers and initiate lively discussions in the classrooms. Good questions make student teachers to think for themselves and want to know more rather than just reciting a fact. Lively discussions result in two way communications which further lead to trust and respect among teachers and students. The unit leads to observation *vs.* inference sessions, where teachers are supposed to ask 'why' questions from student teachers.

Unit Two, titled 'Population and Ecosystem' opens up with open ended enquiry exploration, guiding student teachers to fully explore on a plot of land for living and non-living things, record their findings, and draw conclusions on the basis of their practical work. Teachers may not correct or evaluate them at this point, rather encourage them to discuss the strengths and weaknesses of each group activity. Curiosity, thought, and proof are the driving force of this enquiry-based activity. This leads the student teachers to develop their own strategies, without being threatened by a "right" or "wrong" answer to a question. It further pleads to encourage the student teachers to question each other and "not to shy away from asking critical questions" (p. 25). The teacher may set the tone for a rich enquiry based environment rather than lectures, so that the prospective teachers can learn how to use this technique in elementary classrooms. It asserts that "learning through experience and reflection will last a life time" (p. 25). Student teachers may build their knowledge rather than just taking in knowledge. The unit also implores reflections of the student teachers on the enquiry based activities of past two weeks, and thinking of how they would teach the topic 'population and ecosystem', when eventually they will teach to their elementary school students.

Unit Three, titled 'Diversity, Adaptation and Evolution', encourages student teachers to critically analyze the Darwin's theory of evolution in the light of latest discoveries on evolution which student teachers could explore on any internet search channel, or the latest publications available in the library of the institute/university (suggested activity for session 3, titled 'Debriefing Darwin's Finches: The History of Evolution').

Unit Four, titled 'Earth-the Blue Planet', makes connections and reflects on the contents of the previous units at its onset. The unit elaborates a number of examples for teachers' led demonstrations, explanations, and dealing with common misconceptions of student teachers. It encourages small and large group discussions, speculations and search on troposphere and local weather, hydrosphere and atmosphere, etc. It discusses different local examples for observations, investigation, experimentation and recording the data. It also encourages student teachers to understand the expectations of elementary grade students, making lesson plans and designing age appropriate, concrete, and hands-on enquiry-based activities to inspire curiosity and intrigue among them.

Unit Five, titled 'Force and Motion', guides teachers to facilitate student teachers in investigating forces and linear motion with a model car. It further elaborates on assisting their observation and problem solving so that "they can discover these concepts by themselves" (p. 62). The teacher may deepen the conceptual understanding of several scientific concepts through providing relevant scientific terminologies. They may provide background information through demonstration, discussion, and question-answer technique. Such activities could help them to alleviate their misconceptions. Student teachers are also required to reflect on age appropriate and open ended enquiry-based activities to teach the concepts of 'forces and motion' in the elementary schools.

Unit Six, titled 'Properties of Matter', is the last unit of the teachers' guide. It discusses the modern model of atom vs. the historic model of atom 'used as an example of working with models of atoms' at its onset (p.74). Student teachers are encouraged to review their prior concepts about matter and its properties. Teachers could challenge student teachers' misconceptions through open ended discussions in the classroom. Student teachers could be encouraged to think and reason, explore, experiment, and reach conclusions. They may brainstorm their ideas, list them on a chart, discuss, interpret, and apply. They could present their ideas, critique, and reflect on their peers' presentations in order to develop a sense of ownership of their learning. The unit relates the conceptual understanding of the teacher students with its pedagogical applications in the elementary classrooms.

The Professional Development Standards for Teachers in Pakistan articulated the dire need of reflective thinking and practice, both individually as well as in groups, as a quality indicator of curriculum design and development for teacher education programs. As discussed above, the newly introduced teacher education programs promise high level of critical thinking and reflective practices. However, the major question at present is how these imperatives will be transformed in future classroom settings of Pakistan. The initiative has just started and it surely requires exhaustive and focused efforts to get impetus and the promised future prospects.

## **7. Conclusions and Recommendations**

The critical analysis and the review of literature relating to the topic of study at national and international levels revealed the following conclusions and recommendations of the study:

The first and foremost conclusion of the study is that there is an urgent need to exchange traditional delivery methods with active and independent learning, so that the prospective teachers could think critically and deliver same to their future students. Teacher education programs may be re-oriented towards reflective paradigm. This strategic shift may play an important role to develop the theoretical and pedagogical knowledge base of the teachers working at different levels in the education sector, and consequently, they are able to improve the teaching-learning process in the classroom. The focus of the *reflection* is to explore purposefully the effects of their actions and interaction while teaching.

We must study and understand our indigenous education system in order to create a community of independent critical thinkers and informed citizens of Pakistan. It needs understanding of indigenous intellectual, educational and cultural roots for national identity, and also planning in the right direction for future course of action in education. The neglect to indigenous systems has far reaching effects on national integrity. Accurate knowledge of this rich and deeply rooted educational legacy is vital to the pride of our new generation. The future teachers need not only understanding and mastery over modern pedagogical practices, but also indigenous systems, to make their teaching culturally as well as globally compatible which is imperative to meet the needs of twenty first 21<sup>st</sup> century learners of Pakistan.

The scheme of study for four-year B. Ed (Hons.) program included a complete (3 credit hours) course on critical thinking and reflective practices (Higher Education Commission, revised 2010). Still, the traditional one year B. Ed and M. Ed programs lack such practices in their content or practice. Therefore, it is suggested to include reflective practices in pre-service teacher training programs. It may help the teachers how to reflect on different problems that the teachers may face while working in the classroom and find out proper response to solve the problems. They need to be trained to reflect-in- action and reflect-on-action. The course may need to be developed theoretical-cum-practical basis to update and polish the reflective skills of the teachers. It will help the teachers to become independent learners, problem solvers and facilitators in running the classroom activities.

There is an urgent call for constant testing of the educational theories with respect to classroom practices. These should focus on extensive questioning, reflecting and therefore, construction of new knowledge on the basis of their prior experiences. The framework of teacher education program may enhance eclectic thinking, dialogue, and interpretations. It may include the major techniques and strategies for reflective practices, i.e., question-answer techniques and other open-ended enquiry and investigation methods. The reflective practices make the teacher education programs liberal and humane. Therefore, we should re-think the major goals of our teacher education programs, and re-conceptualize them around reflection, enquiry, and problem-based learning.

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