



Enhancing Affective Domain in Training Science Based Teachers: Towards an Islamic Approach

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Abstract

This paper investigates the role of affective domain in teacher and science education from an Islamic perspective. Affective domain constitutes an integral part of the general framework and theories of teacher and science education; in designing the philosophy and objectives of teacher and science education, emphasis is placed on its importance and role in the education of both teachers and learners in science, engineering and ICT based disciplines. However, in practice, there is often some confusion as to what and how the affective domain component should be envisioned, implemented, and taught. This paper advances the Islamic framework for the development of a fundamental and comprehensive approach to the integration and implementation of affective domain in teacher and science education. It analyses the articulation of values, ethics, worldview, belief system and affective aspects of the teacher's and the learner's personality. The paper concludes that the role of affective domain in teacher and science education from an Islamic perspective is not only important but also provides an integrated guiding approach to the development of the cognitive, psychomotor and behavioral dimensions of the learner.

Keywords: Affective Domain, values, teacher education, science education, Islamic model

Abstrak

Kertas ini menyelidik tentang peranan domain afektif dalam pendidikan perguruan dan sains daripada perspektif Islam. Tidak dapat dinafikan bahawa domain afektif berperanan penting dalam kerangka umum dan teori ilmu perguruan dan sains. Dalam menggubal falsafah dan objektif ilmu perguruan dan pendidikan sains, domain afektif merupakan aspek penting dalam pendidikan bagi guru dan pelajar dalam disiplin yang berasaskan sains, kejuruteraan dan teknologi komunikasi dan informasi. Walaupun teori dalam ilmu perguruan dan pendidikan sains menyatakan kepentingan dan peranan domain afektif dalam disiplin yang berasaskan sains dan kejuruteraan, didapati bahawa ada kekeliruan tentang apa dan bagaimana komponen domain afektif harus digambarkan, diajar dan dilaksanakan dalam disiplin ilmu tersebut. Hal ini berlaku kerana hakikat bahawa pandangan saintifik dan falsafah positivisme dalam ilmu pengetahuan dan pendidikan masih menguasai arena penjana ilmu, penyebaran, pemindahan dan aplikasi. Justeru, kertas ini mengutarakan kerangka Islam dalam pembangunan satu pendekatan yang komprehensif dan jitu bagi penyepaduan dan pelaksanaan domain afektif dalam pendidikan perguruan dan sains. Jadi, aspek nilai, etika, pandangan hidup, sistem kepercayaan dan afektif bagi personaliti seorang guru dan

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pelajar akan dianalisis. Kertas ini merumuskan bahawa peranan domain afektif dalam pendidikan guru dan sains daripada perspektif Islam bukan sahaja penting malah menyediakan pendekatan panduan bersepadu kepada pembangunan kognitif, psikomotor dan dimensi tingkah laku pelajar.

Kata kunci: Domain afektif, nilai, pendidikan guru, pendidikan sains, model Islam

Introduction

In an age of globalization and advancement in science and information communication technology, it is apparent that knowledge is expanding in all fields and specializations. By expansion of knowledge, we mean not only the philosophical and theoretical aspects but also methods and approaches to knowledge creation, dissemination, and application. One of the important areas of research and practice that has become vital in the development of teaching and learning and transfer of knowledge, particularly in institutions of higher learning is the area of science education. Be it the teaching of sciences or engineering or other science based subjects, the fact remains that mastering and managing the pedagogical aspects of teaching and learning is very relevant, not only to the instructors and lecturers, but also to the learners and receivers of knowledge. In this regard, science education in general provides important guidelines, instructional and pedagogical inputs that are necessary for the development of any discipline in terms of addressing the pedagogical issues of teaching and learning and their requirements. This does not include teaching, assessment, delivery, course design, learning outcomes but also issues related to teacher, learner, learning environment, use of technology, psychological, cultural and social aspects.

For an engineer, scientist, or architect, science education is vital not only in his/her pedagogical and cognitive development but also in carrying the profession of teaching in the best possible manner. Furthermore, understanding the learner, his needs, abilities, and cognitive, psychomotor, and affective development is paramount in the success of teaching and learning. The teacher should be able to understand the mind, attitudes and characters of the new type of learners with different aspirations and fast growing needs and requirements. In other words, the teacher should understand that “for the students who are the professionals of the future, developing the ability to investigate problems, make judgments on the basis of sound evidence, take decisions on a rational basis, and understand what they are doing and why is vital” (Brew, 2007, 7). If this is correct, then, it is only fair and just for our institutions to enhance science education and pedagogical aspects of the teacher's professional development to ensure quality of all the inputs, processes, and outputs. Put differently, it is vital to ensure instructors of science-based disciplines, like others, should be empowered with the knowledge, competencies and skills required for the development of

their pedagogical expertise. Hence, science education, among other things, should emphasize, particularly in the professional and personal development of the science-based teachers the abilities to understand and manage the learner and learning. As such, instructors should be able to develop in the various domains such as; cognitive, psychomotor, affective, and social.

The present paper addresses the question of affective domain and its importance in science education. More precisely, it discusses the role of the affective domain, in its broad sense, in the education, training, and development of science, engineering, and other science-based disciplines' teachers.

Put more emphatically, the paper sheds lights on the role of values and ethics in the education and orientation of the teacher in science-based disciplines. In particular, it will touch upon the role of Islamic values and ethics in molding of the character and personality of the teacher and his attitudes towards learning and teaching as well as his teaching and learning activities and interaction with the learners and the wider social environment.

The paper is divided into three parts namely; affective domain and the essentiality of values and ethics in science education from an Islamic perspective, the Islamic perspective of affective domain and affective domain and expectations from teacher and science education.

1- Affective Domain and the Essentiality of Values and Ethics in Teacher and Science Education

A- What is Affective Domain in a Broad Meaning?

To start with, let us recall the basic goals of university education namely; 1) Teaching and transfer of knowledge and information, 2) Nurturing individuals and moulding their personality, 3) prepare and train individuals and professionals such as engineers, scientists, accountants and teachers, 4) creating knowledge and innovating solutions and products, 5) instilling the sense of mission and purpose by enabling the individual to discover and realize their inner potential morally, spiritually, emotionally, physically, socially, culturally. By doing this, the university education opens up horizons and creates value for individuals and communities as well.

As clearly stated in the above statement, one of the functions of the university education is to assist learners discover and nurture their inner qualities. This aspect of education falls within the scope of what has been named as affective domain but in its broad meaning. With affective domain, this paper means the total sum

that includes, among other things, character, attitude, emotions, feelings, tastes, colors, reactions, relations, receptions, responses, choices, values and belief system as well as the moral and ethical aspects. This affective domain is part of the human-being making. Referring to Bloom taxonomy, which stresses the need for three domains in the learning of a person, namely, cognitive, psychomotor, and affective, shows the importance and role of the latter in the development of the learner. Hence, what matters most with the affective domain is not the listing of its elements and components in our curriculum or course outlines but the self-awareness and realization of its importance and impact in one's personality and development. Indeed, what make a teacher different, sometimes, is not his managerial skills and mastery of the subject matter but his emotion, care, attitude, ethics, values. Rogers and Webb (1991) mention, "Good teachers care, and good teaching are inextricably linked to specific acts of caring" (p. 174). Therefore, we should create the balance between the cognitive, psychomotor, and affective doming in our model of teacher education. That is to say, The goal of teacher education is not to create a false dichotomy between the personal and the pedagogical; as Cochran-Smith (2003) stresses,

good teaching requires both professional competence and personal connection. Personal here we mean the affective domain in its broad sense. (Melanie Shoffner, 2007).

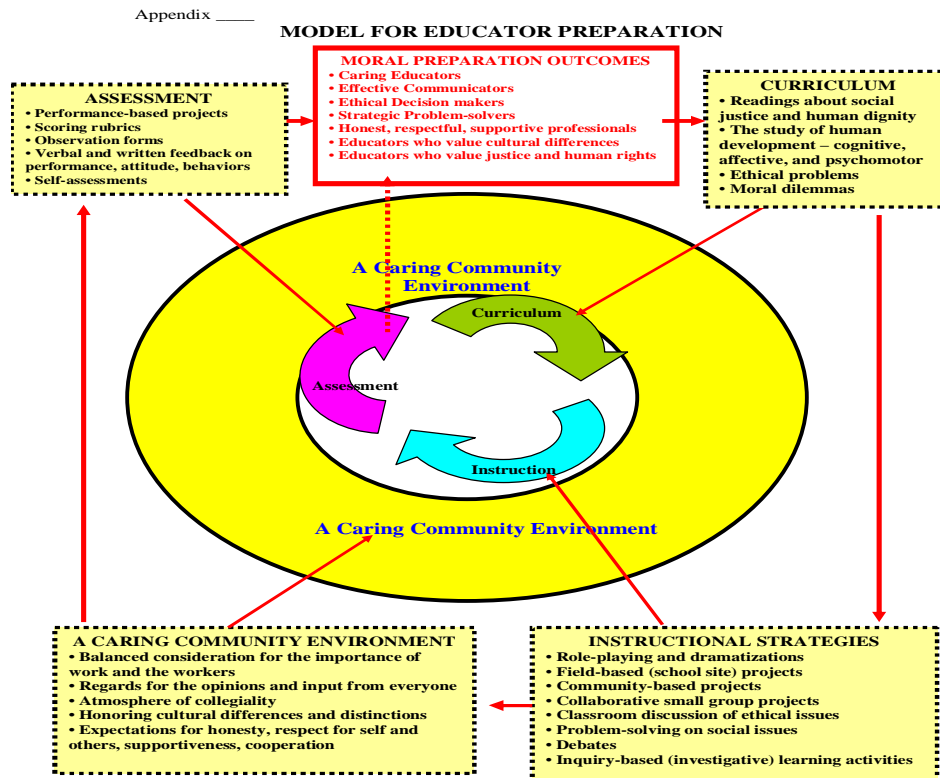
Putting the three domains in a different context, one may talk about three important realms of the development of the learner or individual; the realm of ideas, the realm of personality and the realm of tools, skills, and objects. These three realms are essential in any pedagogical development and hence science and teacher education should address them. While the realm of ideas focuses on intellectual and mind development in terms of possessing the abilities of memorization, thinking, understanding, applying, analyzing, evaluating and creatively engineering new ideas; the realm of personality focuses on the behavior, character, attitude, belief system, virtues, values, world view, and ethics as major components of one's well-being. The realm of skills, competencies, expertise, and tools supports these two realms. Taken together they assist in preparing the learner to mould his or her personality and prepare him for a career in life. Thus, studies shown the affective domain is important and teachers care about it in their preparation. Emotions and emotional states play an important role in learning to

teach (LaBoskey, 1994). Teachers value the personal aspects of teaching, in part because their conceptions of good teachers are focused on the more affective issues of teaching and learning and grounded in a relational, rather than a managerial, view of teaching ([Goldstein and Lake, 2000] and [Walls et al., 2002]).

Affective domain is essential in the preparation of the teacher and learner alike. Teachers education within the framework of contemporary science education, stresses the importance of addressing the need of the teacher in relation to affective domain development. How do we to integrate values and ethics in the teacher and learner education? How do we deliver affective domain contents to the teachers and learners? What are the best possible ways to evaluate the effect of affective domain? How do teach affective domain aspects to the teachers and learners as well? What are the main components of the affective domain? Why is the affective domain important? What is the impact of the affective domain on the overall development and education of the teacher and learner? These questions and others are vital in any model of teacher and science education. Therefore, teacher and science education should address these questions and provide answers. In fact, many models of teacher and science education give due importance to the issue of affective domain and in particular, the role of ethics, values and worldview in the development of the learner and teacher. However, one should note that some models, especially those adopting the positivistic and materialistic worldviews overlook and sometimes nullify the importance and effect of values, ethics, and religion in the development of the learner. That is why we stress here, that from an Islamic perspective, the question of affective domain and values is crucial in not only the learning process and knowledge creation and dissemination, but in the development of the well-being and personality of the teacher and learner as well.

B- Models of Teacher Education and the Required Domains of Learning

There are many models of teacher education, which show the various aspects of the professional and personal development of the teacher. The below illustration shows the importance of moral preparation outcome as well as the need for affective domain. Aspects such as caring, ethical and moral decision, honesty, trustworthiness, steadfastness, justice...etc. are all important in the development of the teacher.



It is so far clear that affective domain and the ethical value system are vital in the development of both the teacher and learner. Therefore, we should enhance this aspect in teacher and science education. Surveying the literatures on the subject matter show that there are many models which set certain requirements for the development of the teacher. One of the models states that teachers should have the following qualities:

- Know their subjects well and how to teach them to students;
- Understand how learners learn and develop;
- Understand their own language and culture and know how to learn about other cultures;
- Know how to develop a curriculum and learning activities that connect what they know about their students to what the students need to learn;
- Know how to teach specific subject matter in ways that are accessible to a diverse range of students;
- Know how to develop and use assessments that measure learning standards and how to use the results to plan teaching that addresses student learning needs;
- Know how to create and manage a respectful, purposeful classroom;
- Are able to identify and plan for learner's learning needs;
- Are able to develop interventions, track changes, and revise their teaching strategies as necessary; and
- Are able to work with parents and their colleagues to create a common set of expectations and collective supports for students' learning.
- Holding and communicating high expectations;
- Providing examples of good work;
- Doing more than standing and lecturing;
- Using multiple instructional strategies;
- Utilizing small groups when appropriate;
- High levels of "instructional discourse"
- Classrooms were well organized and efficient (CASEL: SEL and Academic Performance).

This model, for instance, shows the importance of the above mentioned learning domains on the development of the teacher and learner. Its main components spelled out the various requirements that a teacher need to possess to become an example efficient instructor.

To go one step further in exploring the importance of affective domain from a western perspective the following models stress the aspects: 1) *knowledge*—the facts they know and concepts they understand; 2) the *skills* they use in managing and applying their knowledge, such as computation, experimentation, analysis, synthesis/design, evaluation, communication,

leadership, and teamwork; 3) the *attitudes* that dictate the goals toward which their skills and knowledge will be directed—personal values, concerns, preferences and biases. (Armando Rugarcia and others). In this model, the aspect of affective domain is referred to as one important aspect of the learning domain of a learner. Douglas Ruth has aptly outlined what an engineer would need to develop himself and acquire the qualities needed for his profession. He argued that outside of the obvious goals of technical competence; I believe that our engineering education systems should be designed with the following two additional goals in mind: 1- graduates must have a sound grasp of the fundamentals so that they can renew the "knowledge" on which their continued practice depends. In short, they must be prepared to do continuing education. 2- graduates must be able to interact effectively with other disciplines of engineers and people outside of the engineering profession. In short, they must understand how other engineers and non-engineers think. (Douglas Ruth).

The above discussion has provided us with a general grasp of the idea of affective domain and how it is linked to values and ethics. The next section deals with the Islamic perspective of the affective domain emphasizing the crucial role of values and ethics in the development and well-being of the learner.

II. The Islamic Perspective of Affective Domain

A- Affective Domain: The Driver and Regulator of the Learning Activity

Within the Islamic worldview, ethics, values, and moralities are not mere theoretical individualistic values but are main drivers, motivators, and regulators of one's activities and action. Values and ethics are meant to influence one's behavior and actions. As such, they involve in refining the conduct of the person and his intellectual, cognitive, emotional, behavioural activities. In other words, values and ethics in Islam create the necessary positive tension, motivation, and drive that urge the individual to abide by the teaching of God and His instruction. Hence, they play an effective role in the development of the individual. For instance, Ibn Jama'a, a great Muslim classical educationalist in his book (*Tadkirat al-Sami'a wa al-Mutakalim*) argues that if you refer to our ancestors and their followers, you will realize that the benefit and success of the teacher happen only if he is pious, and his words and works reflect that. He further provides a deep insight on the role and function of affective domain and values in the education of the teacher and learner as well. Among

other things, he stressed that the teacher should be creative and mastering one of the subjects so as he runs away from the enmity of ignorance, he should master his subject in full details and deep understanding; he should be a continuous learner, cautiously do research, study and acquire knowledge, read, memorize, classify, research and comment without wasting any moment of his life to acquire knowledge save for necessary things of life.

It is so far clear that the Islamic perspective gives due recognition and function to the realm of values and ethics in the learning process. Indeed, putting piety and *amaanah* as the governing values of learning shows to what extent is the affective domain important in Islam. Put more emphatically, the Islamic worldview provides us with a comprehensive perspective of the affective domain. Islam stresses the following aspects of the affective domain in the learning process:

High sense of responsibility, *amaanah*, integrity and understanding of the teacher's role.

Abide by the Islamic virtues and moral values such as humbleness, kindness, patience, sacrifice, respect.

High sense of respect for the profession and learner.

Understanding of the need for the advancement of the Islamic worldview principles and values in knowledge and personality development.

- Role model in quality, excellence, relations, teaching...

- Psychically and mentally fit for the job.

- Mastering the specialization and subject matter as an act of worship.

- Cooperative, helpful, receptionist and responsive to the surroundings and environment of learning.

- Posses the skills, competencies and abilities required of a good teacher.

- Aware of the new methods and approach used in teaching and learning.

- Aware of the issues and problems of his society and able to respond positively.

- Aware of the problems facing the profession of teaching and learning and able to cope and adopt.

Thus, the Islamic model of teacher and science education stresses: balance between knowledge and faith; integration of learner's knowledge, character and attitude; balance in the learner's journey between the demands of this world and the hereafter; holistic education (Intellectual, spiritual, social, behavioural, attitudinal, physical, material and skills developments); Sense of responsibility and mission towards the God, self, society and other surroundings. Therefore, science education from an Islamic perspective, besides

considering the cognitive and psychomotor aspects reserves an important place for the affective and value aspects. Hence, the curriculum and programmes for the development of science-based teachers need to stress the following aspects:

- Intellectual and knowledge qualities
- Faith and spiritual qualities
- Values and ethics qualities
- Psychological and social qualities
- Physical and aesthetical qualities
- Professional and moral qualities
- Managerial and Leadership qualities
- Creative and critical thinking qualities.
- ICT mobilization for teaching and learning
- Lifelong learning pursuit
- Cultural and socio-economic and political awareness
- Global mentality and exchange of expertise and experiences.
- Practical exposure to teaching and learning experiences
- Comprehensive quality pursuit

B- Islam and Affective Domain: An Example from Engineering Education

Having explained the general aspects that are required for the development of teacher from an Islamic perspective highlighting the importance of the three learning domains, let us provide a more specific example in engineering education. Even though there are some generic competencies and skills that cut across the disciplines, there are certain specific aspects, which are applicable to certain disciplines than others.

In general, terms, Islamic view of sciences projects a Muslim engineer, scientist, architect, biologist...more than mere academician or professional. It looks beyond the professional qualifications and experiences stressing the other qualities of an individual like his morals, ethics, values, and virtues, sense of a mission, social responsibilities, and civilizational duties as a vicegerent of God. A Muslim engineer is a vicegerent in whom the attribute of vicegerent has developed and in whose thought the system of concepts related to the vicegerency are settled harmoniously. He or she has transcended his own self, and his soul, spirit, and values have found their direction through the guidance brought by the Islamic worldview. He is such a man with a view of being perfected on a comprehensive level. It is possible to observe this process of perfection in his perfect being, which includes:

- Possession of a core body of knowledge, information, and conceptual framework of engineering specialization imbued with Islamic vision of life and ethical system.
- Possession of an engineering mindset and orientation guided by the general values of Islam.
- Possession of intellectual abilities, including analytical, critical, synthetic, and evaluative abilities.
- Possession of a body of moral and ethical values that guide him/her in all aspects of life.

Besides all the above aspects, the Muslim engineer/scientist is working and developing within a framework and guideline, which stress the following important components:

Belief system: the Muslim engineer is guided by a revealed belief system, which leads to a deepening of the dimensions of worship, spiritual life, and relation with God. Thus, worship is the chief element in the life of the Muslim engineer/scientist charged with the mission of vicegerency. Through it, he may find support at every stage of his life, particularly in distressing or difficult times. Similarly, his or her intellect is in harmony with his aims and goals, bound by limits, and a centre observing the heavens and earth, to seek out the right and the good. (Abdelaziz Berghout, 1998)

Spiritual and psychological system: the Muslim scientist/engineer is spiritually stable and fit. Based on his or her belief system the spiritual components of his personality are crucial in his or her development. Emotion, feelings, wills, intentions, responses to the internal and external surroundings make a major part of his or her well-being. If these essential elements are developed based on the Islamic belief system, then, the Muslim engineer's development will be balanced and well integrated. By virtue of this aspect, he/she is capable of making all the self-sacrifice necessary to realize his or her potentials as a vicegerent. (Abdelaziz Berghout, 1998).

Behavioral and Actioning System: The formation related to action, attitude and behaviour, by which scientist/engineer reflects outwardly his beliefs, the *Shari'a*, his mission, and his principles. In this way, his life becomes coherent and harmonious both theoretically and practically, in word and deed, and in thought and behaviour. By virtue of this harmony, which he has developed, and elevated, his life rises to the high levels marked by those who have taken the way of prophethood. (Abdelaziz Berghout, 1998)

1) Cultural and Social System, which decks out the individual and society with the apparatus necessary for social and cultural communication. Just as this apparatus makes the Muslim such that he does not remain outside global culture, so it causes him to feel pride in his own culture, history, and inheritance. "Our Knowledge grows when we recognize diverse perspectives, when we go beyond the routine and narrow interpretation of events, when we look at a broader picture. We can then see how stereotypical modes of thought have shaped our values, laws, and policies. We can also see ways to use positive and life-affirming visions to guide us acquire techniques to address oppressive practices"¹ (Wanda Teays, 2003).

2) Moral and ethical system: A Muslim engineer/scientist is bound by very comprehensive moral and ethical systems, which govern all aspects of life, including the development of the cognitive and psychomotor. This system provides a set of ethical guidelines and principles, which create a moral communal environment for the development of the individual.

It is thus far obvious that the Islamic worldview highly values the importance and function of the affective domain. In fact, the above five aspects are all related to the development of the affective domain. As explained earlier, these aspects influence immensely the development of the individual at all levels intellectual, cognitive, psychological, emotional, behavioural, social, cultural...etc.

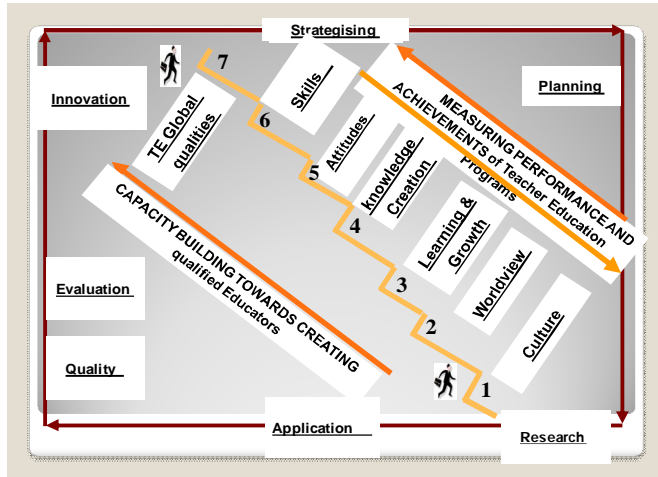
III. Affective Domain and Expectations from Teacher and Science Education

Given the fast developing teacher and science education as well as the new demands and expectation of learners and teachers, education in the science-based disciplines needed to revolutionize not only their cognitive and psychomotor domain but also their affective domains. If we really aspire towards nurturing real teachers and instructors who are scholars with a mission, we need to adopt a more progressive and dynamic paradigm of teacher and science education. Hodge argues that scholar model requires a fundamental shift in how we structure and imagine the whole undergraduate experience. It requires, as a minimum, the adoption of the Learning Paradigm in everything from the first introductory course through the final capstone experience. It requires a culture of inquiry-based learning infused throughout the entire liberal arts curriculum that starts with the very first day of college and is reinforced in every classroom and program"

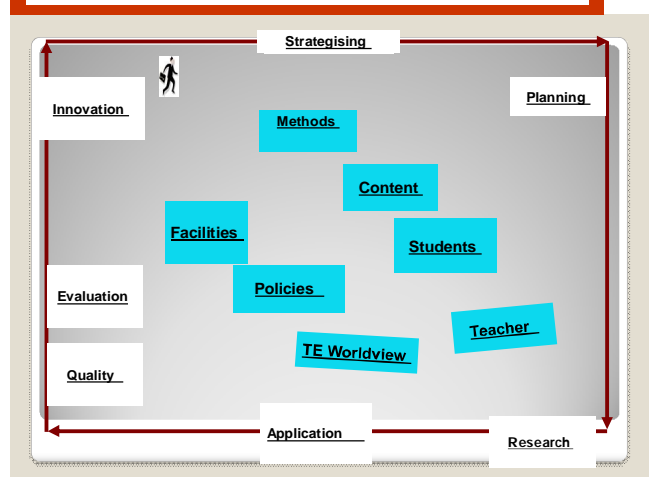
(Hodge *et al.* 2007, 1). However, it is important to note that the new paradigm should place the affective domain in its proper scale and position to ensure capitalizing on it for the betterment of the teachers' effectiveness and productivity. In a society where immoral and unethical risks and practices prevail at all levels, affective domain, especially the aspects of belief, world view, ethics, values, emotional intelligence should become the driver of the learning process and guide the cognitive and psychomotor learning activity. This is so because the affective domain plays an important, yet often overlooked, role in the development of today's teachers and reflection is one method to support such development. ([Shoffner, 2006], [Shoffner, 2008] and [Shoffner, in press]). Hence, teacher education not meant only to train teachers who are engaging "in the production of knowledge; they must also be educated to cope with the risks and uncertainties generated by the advance of science" (Scott 2002, 13). Therefore, affective domain becomes crucial in addressing those risks and unwanted activities that lead to the destruction of the well-being of people and the social fabric of the community. Cochran-Smith (2003) presents the complicated nature of teacher quality well when she writes that "teaching and learning are matters of both head and heart, both reason and passion" (p. 374). While competence can be quantified in any number of ways, the affective elements also needed for good teaching and good teachers should not be dismissed because of their non-standardized nature. Zembylas (2007) explains this intersection of the pedagogical and the personal as emotional knowledge, which he defines as "a teacher's knowledge about/from his or her emotional experiences with respect to one' s self, others (e.g. students, colleagues) and the wider social and political context in which teaching and learning take place" (p. 356). Emotion is not something to be separated out of the preparation of ...teachers or ignored once they reach the classroom since, in order to be effective educators, "teachers must be able to connect their emotional understanding with what they know about subject matter, pedagogy, school discourses, personal histories, and curriculum" (Zembylas, 2007, p. 364). Having said that it is crucial to find ways and strategies on how to rejuvenate and enhance the effect and function of the affective domain in the education of the teacher as well as the learner. Therefore, we propose that model of teacher education from an Islamic perspective should articulate and position the affective domain in core of the learning experience and practice of both the teacher

and the learner. The following illustrations show the perspective of the science-based teacher educator where the affective domain plays a crucial role.

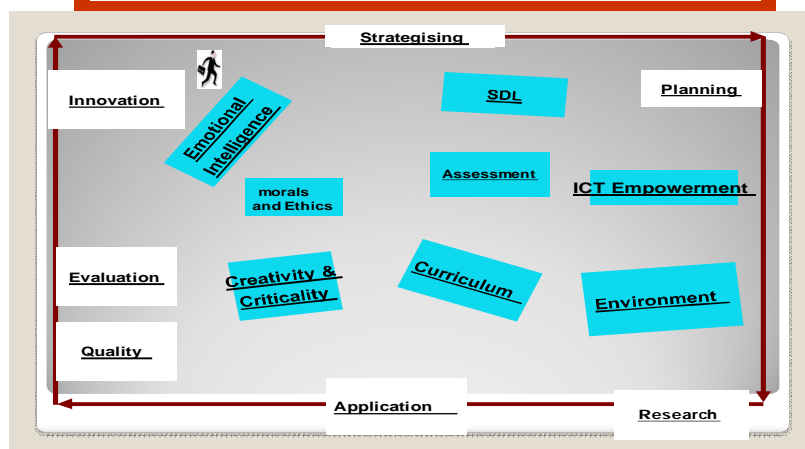
Teacher Education Framework (1)



Teacher Education Framework (2)...



Teacher Education Framework (3)...



The three illustrations identify the important aspects of the framework for teacher education. As such, the affective domain is put in the core of the model. The first illustration shows the various components of the learning domain, including the affective domain. The second shows the various elements of the teaching and learning environment, including; teacher, student, curriculum, delivery, facilities, policies and the entire teacher education world view which is part of the affective domain. Whereas, the third other elements

stress on the affective domain namely ethics and values and emotional and aspects. Additionally, the framework shows that dealing with the affective domain is to put in context of strategizing, planning, researching, implementing, achieving quality standards, evaluating and innovating. This indicates that we should deal with the integration of the affective domain as a systematic process, which requires systematic efforts and planned actions.

Conclusion

To recapitulate what has been elaborated in the forgoing pages, I trust and believe the main message of

the paper is that affective domain is a curriculum in the development of both the teacher and learner. Hence, the programmes of teacher preparation and the aspects of

science education should revisit the place, role, and function of the affective domain in the entire process of learning. Some models of learning and teacher education might mention the affective domain but placed in the periphery of the learning process. Therefore, what is required is to re-capture the real essence, function of the effective domain, and reflect it in the policies, programmes of teacher preparation, curriculum, assessment, and delivery. I re-emphasize what Cochran-Smith (2004) states, “teaching has technical aspects to be sure, and teachers can be trained to perform these. However, teaching is also, and more importantly, an intellectual, cultural, and contextual activity that requires skillful decisions about how to convey subject matter knowledge, apply pedagogical skills, develop human relationships, and both generate and utilize local knowledge” (p. 298).

We conclude also that from an Islamic perspective, affective domain is crucial not only in building the moral, ethical and in behavioural aspects of the teacher and learner but also in guiding the process of cognitive and psychomotor development. This, in turn, paves the way of a better understanding and implementation of the affective learning in the process of educating the teacher and learner.

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Article history

Received : 09/09/2012

Accepted : 15/12/2012