Conceptualizing the Structure of Belief and Belief System – An Alternative to facilitate Teaching, Learning and Curriculum Development

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Abstract

This paper attempts to conceptualize the structure of belief and belief system, based upon available research findings and hypotheses about beliefs. It is hoped that the conceptualized belief structure and system would serve as an alternative base for teachers and educators to understand better /explain the relation and effect of beliefs on teaching and learning, and to facilitate curriculum planning and development.

Introduction

Curriculum reformation and modification of teaching strategies have always been taking place to motivate and facilitate students’ learning. In framing the models of teaching and curriculum, teachers and educators are well aware of the functions of psychological principles in instruction and curriculum development. Many learning activities and curricula are targeted at the motives of students, emphasizing the “joy of learning” and “effective teaching”, and promoting “reflectivity and creativity of the learners”. In spite of the efforts spent, we found teachers and/or students did not favourably receive some of the well-intended curriculum and instruction. The National Curriculum in Britain is one example. The Target-Oriented Curriculum (abbreviated as TOC) in Hong Kong is another, with considerable criticisms from school heads and teachers even though some of them admitted the curriculum carries merits in principle. As well, the categorization of secondary schools into CMI and EMI schools as a measure to promote the use of Chinese or mother tongue as the medium of instruction in secondary schools in Hong Kong after 1997 has also encountered objection from some parents, principals, teachers and even students despite repeated announcement by the Education Department on the benefits brought to students’ learning in using the mother tongue in teaching (MOT). Obviously there are many complex factors accounting for the difficulties in implementing the policy and curriculum changes. The factors include the feasibility and practicability of introducing the new changes in curriculum and mode of teaching and learning in the local context, the availability of
resources and support to school teachers. This also applies to other kinds of curriculum and instructional changes in Hong Kong, such as school-based curriculum, mastery learning, and integrated curriculum.

There are, of course, constraints and limitations for every designed curriculum and instruction/learning programme to be conducted in all schools and levels of study. There is one important but always neglected factor that influences the success or failure of the renovation/changes in curriculum, teaching practice and learning. That is, the beliefs of teachers and learners, who are the executors and recipients of the introduced programmes/instruction. Whether the teachers and students believe the curriculum and learning materials are useful and worth learning will determine their degree of acceptance of the programme and instruction. In other words, the readiness of the teachers and learners to participate in the designed/implemented teaching/learning programmes are influenced by their beliefs and values placed in these programmes. Without their acceptance and support, it is hard to see any success brought about by researchers, educators and policy makers in putting forward the intended changes. Nevertheless, this important factor that influence the success or failure of the curriculum, teaching and learning are seldom attended by policy makers, curriculum designers, educators, institutions/organizations that initiate the changes.

**Research in Beliefs**

Research since late 1980’s have indicated a close relation exists between teachers’ beliefs and teachers’ implicit theories about teaching/learning (Clark & Peterson, 1986), subsequently influencing their class teaching behaviour. As well, students’ beliefs have influential effects on their cognition and motives to learn (Dweck & Leggett, 1988). For example, the persistence of belief in attribution of students’ failure due to their low abilities could result in learning helplessness behaviour and reluctance to learn. Richardson (1996) has already pointed out the importance and role of attitudes and beliefs in teaching and learning. Conceptualizing the nature and structure of beliefs held by teachers and students becomes a possible alternative to facilitate teaching, learning and curriculum development. Thus, one needs to understand the structure of belief and belief system to account for the belief changes, hence the attitude and behaviour towards learning and teaching.

Till now, there are only few literature on belief structure and belief system, causing it a under-developed area of research. This paper attempts to conceptualize the nature and structure of belief and belief system, based upon available research findings.
and hypotheses about beliefs, so as to help teachers and educators understand better the relation and effect of beliefs on teaching and learning, curriculum and instructional innovation, hence cast insights on the roles of beliefs to facilitate teaching, learning and curriculum planning and development.

This paper begins with the nature of beliefs through differentiating beliefs from knowledge; the two are often confused with one another. Afterwards, the paper provides a discussion of the structure of beliefs and belief system based on available literature, followed by integrating research findings in literature to propose a belief structure and belief system. Where appropriate, instances of students’ learning and reactions towards curriculum / teaching approaches were given to support the author’s proposed theoretical framework on belief structure and function. The paper concludes and suggests teachers and educators to consider the structure of beliefs and belief systems as an alternative to account for the outcome of implementing new changes in instruction and curriculum, thereby stating the need to understand the roles and functions of teachers’ and students’ beliefs in the design and planning process of instructional and curriculum changes so as to facilitate its development and successful implementation.

**Beliefs and Knowledge**

Beliefs are seldom clearly defined in studies or used explicitly as a conceptual tool in educational discussions. The exception being the chosen, and perhaps artificial, distinction between belief and knowledge which is common to most definitions. Many definitions carry the view that belief is based on evaluation and judgement while knowledge is based on objective fact (Pajares, 1992, p. 313). To distinguish between beliefs and knowledge, where the two terms have been used interchangeably in the teacher education literature, Fenstermacher (1994) argued that knowledge has higher epistemic status than beliefs and that knowledge has justifiable, supportable claims.

Similar arguments of differentiating beliefs and knowledge have also been found in the traditional philosophical literature. The argument that knowledge depends on a “truth condition” suggests that a proposition is agreed on as being true by a community of people (Green, 1971; Lehrer, 1990). Beliefs however, do not require a truth condition. Based on this viewpoint, Feiman-Nemser and Floden (1986) pointed out that not everything a teacher believes or is willing to act on merits the label ‘knowledge’ (p.515)

According to Nespor (1987), beliefs have stronger affective and evaluative components than knowledge and that affect typically operates independently of the
cognition associated with knowledge. Finally, beliefs were often found to be associated with particular, well-remembered events and this may account for the fact that certain beliefs are strongly held by individuals and difficult to change. In addition, Nespor has suggested that beliefs tend to be organized in terms of larger systems, which are loosely bounded networks with highly variable and uncertain linkages to events, situations, and knowledge systems. The larger belief systems may contain inconsistencies and may be quite idiosyncratic; yet, they have great value in dealing with complex, ill-defined situations. Such systems help to interpret and simplify classroom life, to identify relevant goal, and to orient teachers to particular problem situations (Calderhead, 1996).

To Ernest (1989), knowledge is the cognitive outcome of thought while belief is the affective outcome. However, he acknowledged that beliefs also possess a slender but significant cognitive component. Ernest’s suggestion to differentiate knowledge from beliefs by considering knowledge being cognitive and belief being affective so that knowledge may be empirically tested, however, seems somewhat mechanistic. It seems difficult to have knowledge or truth existing in the absence of judgement or evaluation. The overlapping nature of knowledge and beliefs were also evidenced in a study conducted by Alexander and Dochy (1995) on the conceptions of knowledge and beliefs across the American and European culture groups. The relationship between these two constructs was interpreted as dynamic. The knowledge an individual holds is directly influenced by an individual’s belief network and, in turn, one’s beliefs network is influenced by the knowledge one holds and acquires, that is, there is a reciprocal movement from one entity to the other.

In consideration of various views about the nature of beliefs and knowledge, the author assumes that belief is cognitive based and epistemic as well. There is an element of knowledge within beliefs, which comes from experiences, either direct or inferential. The distinction of belief from knowledge lies in its structure and function associated with some other components such as the affective and evaluative. Based on all these research studies, the author attempts to propose a model as illustrated in the following section to describe and account for the belief structure and its function. It is due to the action of the cognitive, affective, evaluative and other components associated with the belief structure that process the knowledge or information attached and generates a particular belief held by the individual.

Sources of Beliefs
Depending on the sources, three types of beliefs are distinct. They are descriptive, inferential and informational beliefs. Descriptive beliefs arise from personal observation or direct encounter with object. Inferential beliefs arise from inferences about these observations or encounter. Informational beliefs come from sources outside of personal observation or direct encounter with object. Informational beliefs come from mass media or communication including text (Block & Hazelip, 1995; Fishbein & Ajzen, 1975; Rokeach, 1968). From these, descriptive beliefs about education are rooted in an individual’s school experience and are consequently most resistant to change.

Student teachers who enter a teacher education program may carry initial ideas and beliefs, which are resistant to what is taught in the colleges and universities. (Brookhart & Freeman, 1992; Clark & Peterson, 1986; Nespor, 1987). The student teachers’ existing knowledge and beliefs are critical in shaping what and how they learn from their teacher education experiences. For instance, Brookhart and Freeman (1992) found that “entering teachers view the nurturing and interpersonal aspects of a teacher’s role as more important than academic aspects” (p.51). Weinstein’s (1988, 1989) study of elementary teacher education students before teaching practice indicated that the prospective teachers consistently expected teaching tasks to be less problematic for themselves than for others, particularly in the areas of organization and management. Weinstein (1988, 1989) suggested that preservice teachers may be “unrealistically optimistic” about their future teaching performance. Weinstein considered this could translate into a lack of motivation to become seriously engaged in teacher education. Student teachers believe that there is not much they can learn in preservice teacher education except during their student teaching experiences (Book, Byers, & Freeman, 1983). It is often the case that student teachers become more reluctant to act upon the information that is presented to them after they have their first teaching experiences, and they begin to question the potential relevance and impact of educational theory on classroom teaching (Tillema, 1995). By making student teachers’ beliefs known to themselves and teacher educators, they can work together for a better match of programme materials with the students’ belief to achieve higher effectiveness.

**Beliefs Components and Structure**

Literature on belief structure is scarce due to the difficulty of approaching the topic. In general, theorists agree that beliefs are created through a process of enculturation and social construction (Pajares, 1992, p. 316). An early description of
belief structure and belief system was given by Rokeach (1968) who argued that all beliefs have a cognitive component representing knowledge, an affective component capable of arousing emotion, and a behavioral component activated when action is required. When clusters of beliefs are organized around an object or situation and predisposed to action, this holistic organization becomes an attitude. Beliefs may also become values, which house the evaluative, comparative, and judgmental functions of beliefs and replace predisposition with an imperative to action. He argued that beliefs, attitudes, and values form an individual’s belief system. Understanding beliefs requires making inferences about an individual’s underlying states, which is difficult because individuals are often unable or unwilling, for many reasons, to accurately represent their beliefs.

Rokeach’s theory on the organization of beliefs, attitudes and values is somewhat dated, yet it is a useful foundation for further investigation and development in this area. Knowledge, as well as affective and behavioural components underlying belief help us interpret and account for the action performed by individuals. The cognitive component representing knowledge is evident when we take belief as a proposition or assumption about a person, an object or an event. However, the existence of an evaluative or judgmental component within a belief structure, (which explains how various alternatives are discriminated) has not been included in Rokeach’s theory. Thus, an inclusion of an evaluative component in addition to the cognitive, affective and behaviour component as suggested by Rokeach deems necessary to give a fuller account of the structure and functions of beliefs.

**Belief System**

Rokeach (1968) defined a belief system “as having represented within it, in some organized psychological but not necessarily logical form, each and every one of a person’s countless beliefs about physical and social reality” (p.2). His analysis is based on three assumptions: (I) beliefs differ in intensity and power; (II) beliefs vary along a central-peripheral dimension; (III) the more central a belief, the more it will resist change.

He likened a belief structure to an atom, its nucleus holding together the various particles in a stable system. Some beliefs form a nucleus of the system in this central peripheral dimension, and these central beliefs are more important and resistant to change. Belief substructures (attitudes, values) are part of this belief network, or web, and can also be thought of as connected to central or peripheral strands of that web.
Their strength may be interpreted by their functional connections to other beliefs and structures, and this connectedness permits one to infer their importance and predisposition to action.

This conceptual model is simple in that human beings have different beliefs of differing intensity and complex connections that determine their importance. The network structure of belief system, assuming a centrality and peripheral organization of beliefs, implies the existence of relevant levels. This assumption is parallel to the hypothesis of the surface and inner beliefs put forward by Roseman (1994).

To explain belief change, Pajares (1992) suggested the use of a model of conceptual change developed by Posner, Strike, Hewson, and Gertzog (1982). In this model, Piaget’s concepts of assimilation and accommodation are used to describe how new phenomena are dealt with. Assimilation is the process whereby new information is incorporated into existing beliefs; accommodation takes place when new information cannot be assimilated and existing beliefs must be replaced or reorganized. Both result in belief change, but accommodation requires a more radical alteration of existing beliefs. When metaphysical and epistemological beliefs are deep and strong, an individual is more likely to assimilate new information than to accommodate it. As well, where preconceptions are relatively few and weak, integration (or adaptation) of new information through process of assimilation - acquisition of knowledge through addition and accretion will be comparatively unproblematic. However, these situations are rare because student teachers do have an established knowledge base and belief (valid or not) by the time they enter programmes of teacher education (Tillema, 1995). People are unable to change beliefs they are unaware they possess, and they are unwilling to change those they are aware of unless they see good reason to do so. Change becomes more and more difficult as beliefs form a protective belt against information that is incongruent with the existing framework (Tillema, 1995). Student teachers are no exception and they have a tendency to stick to the beliefs they have acquired and changing these beliefs is dependent on a range of factors.

Research studies have indicated that existing belief structures are resistant to change. According to Posner et al (1982), before most accommodation (involving radical transformation, active reconstruction of existing ideas and beliefs) can take place, individuals must be dissatisfied with existing beliefs and new beliefs must be intelligible and appear plausible. Moreover, new beliefs must be consistent with other conceptions in the ecology. In Rokeach (1968) terms, they must have functional connections to other beliefs in the structure. Learning and inquiry are dependent on
prior beliefs that not only make current phenomena intelligible but also organize and define new information. Beliefs are unlikely to be replaced unless they prove unsatisfactory, and they are unlikely to prove unsatisfactory unless they are challenged and one is unable to assimilate them into existing conceptions. Even when this happens, something that should have been assimilated is resisted, in short, belief change is the last alternative. Supporting evidence for this position has been found by Posner et al. (1982). They found that students in their study rejected new information, considered it irrelevant, compartmentalized their conceptions to prevent it from conflicting with existing beliefs, or even forcefully assimilated it in the face of conflicting logic, reason, and observation before they would consider accommodation.

Explanations as to why some beliefs are strongly held have been given by the functional theories of attitudes. However, such theories give an incomplete account of what determines belief strength. Researchers have identified other bases for belief, such as values and group identifications. In addition, there should be some specification of important goals, goal-directed actions, and the instrumentality’s of those actions to goal attainment for a system of beliefs to be strongly held (Roseman, 1994).

Roseman (1994) proposed a belief system of five structurally related components or belief types. These components have been termed evaluative, behavioural, identificational, normative and explanatory. The evaluative component describes alternative outcomes differing in desirability. The evaluative component specification of important outcomes provides the motivation for holding the beliefs strongly. The behavioural component provides a means by which these outcomes can be controlled. Each course of action and related outcome is associated with particular groups or individuals having certain attributes, denoted by the identification component. The identification component is needed to specify that adherents are in some way affected, and can themselves be agents of their fate. The actors, actions, and the outcomes also differ in imputed morality or legitimacy. It is the normative component, which provides the confidence that the ideology will triumph in accordance with the prevailing moral order. The explanatory component is needed to account for how recommended actions produce desired outcomes, and to answer opposing arguments. Acceptance of all five components and their organization into a coherent narrative makes ideological belief and action a means to the attainment of important personal goals.

Roseman (1994) proposed that these five component belief types were
integrated into dramatic stories. The stories could be represented as loosely organized within three concentric layers, somewhat like a fruit with a pit in the center. The outermost or surface layer of each belief, was a story with component content that most adherents could agree upon. On the surface, because of common belief elements, different individuals professing a given belief looked similar. Beneath this surface, there appeared to be a relatively “soft”, middle layer containing stories that varied from adherent to adherent and might change over time. This layer elaborated upon and thereby nourished and sustained the common surface beliefs, in different ways for different individuals. Underlying all of these beliefs, in an innermost layer, was a relatively “hard” central core narrative, which, as suggested by Roseman, contained the seed of many strongly held systems of belief and remained invariant over time.

Roseman’s proposed structure of beliefs and their organization accounts for the existence of strongly held beliefs and explains how the five components work in belief formation. This theory appears to be richer in its conceptual development than that of Rokeach (1968) in that it describes how various components actually account for the formation of specific beliefs. Roseman is able to give a fuller description of how the five structural components are organized and function to explain the relation of a specific belief to a particular action or behaviour.

Proposed Framework of Belief Structure and Belief System

Based on the ideas of Pajares (1992), Rokeach (1968) and Roseman (1994), the author attempts to formulate a synthesised framework of hypothetical belief structure and belief system.

A Hypothetical Structure and Function of Belief

Not only are knowledge and beliefs inextricably intertwined, the potent affective, evaluative, and episodic nature of beliefs make them a filter through which new phenomena are interpreted. (Abelson, 1979; Calderhead & Robson, 1991; Goodman, 1988; Nespor, 1987; Nisbett & Ross, 1980; Posner et al., 1982;). Thus, the structure of individual belief should have many components. Integrating previous knowledge and ideas from the literature review, the author proposes a five component structure of belief - cognitive, affective, evaluative, identification and conative as illustrated in Figure 1.
The cognitive component is the component that processes the knowledge element of belief. To process and acquire new information, e.g. knowledge or experiences (belief based), the author will adhere to Piaget’s concept of schemata formation through assimilation and accommodation. Whether the new information is assimilated or accommodated in a belief structure depends on a number of factors. One such factor relates to the nature of the new information and the original belief. New information (say a belief statement, or a proposition about an object or an event) encountered in reading, observing or hearing which is similar or close to an existing belief is likely to be accepted and assimilated (sometimes unconsciously) and consequently strengthen the original belief. A teacher who is accustomed to a traditional method of teaching and has a strong belief in its value would be resistant to any new information or proposition of change, which is not consonant with that tradition. The reactions of Hong Kong primary teachers towards a promoted reformation in curriculum can be taken as an example of this. Many experienced teachers have no faith in the new approach to curriculum called “Target Oriented Curriculum”, abbreviated as TOC, promoted by the Hong Kong Education Department. This is an initiative in which students learn with clearly defined targets at different
stages in accordance with their abilities. Students will develop critical thinking and creative learning based on defined criteria related to their abilities rather than the traditional norm-referenced mode. Teachers appear to resist promotional information associated with this initiative like “Children learn more effectively with the Target Oriented Curriculum”, because it is contradictory to their original belief in the value of traditional approach which is derived from their past experiences and observation. Instead, they are ready to assimilate sarcastic statements or beliefs provoked by some teachers, such as “TOC means Totally Out of Control” and “TOC is the Terror of Century” because these adverse propositions about the new approach of teaching match their prior belief such as - “The traditional approach of teaching is much better than the new one, the new one just takes greater effort and is ineffective”. Subsequently, the initial belief in traditional approaches of teaching and curriculum is strengthened on hearing adverse comments of the new approaches from other teachers.

New information, which is not consonant with a person’s existing belief, will possibly draw his or her attention to and activate an affective component. The emotion aroused by the activated affective component in turn will drive the identification component to operate, and once the identification component is involved, there is a tendency to act or behave by means of the conative component. Meanwhile, the evaluative component also functions as to decide which alternatives for action is chosen. In other words, a series of activities propagated along the five interrelated components within the belief structure when it is stimulated with incoming information, which is not consonant with an existing belief.

To elaborate this discussion, when a person encounters a piece of new information or belief, which is inconsonant with one’s current beliefs, his or her emotion will be aroused through activation of the affective component. Consequently, a person’s perception of the new information will be strongly influenced by his or her emotional state. The strength of the emotional reaction towards new information is associated with experiences embedded in the existing beliefs retrieved. Usually, experiences related to ‘Self’ have stronger feelings. Meanwhile, the identification component operates to identify which person or object the new information is referring to or affecting. If the ‘Self’ is involved, the new information will inevitably relate to, and interact with, the associated personal experience in the prior belief. Happy and unhappy experience of the ‘Self’ is retrieved from one’s beliefs when the affective component is activated. If the new information or proposition is contradictory to what a person has believed, modification of an existing belief is necessary in order to accommodate the new information or belief. The emotional affect usually influences
how a person copes with contradictory beliefs or information. If the person is satisfied with an existing belief, he or she tends to resist the new information and persists with the prior belief by denying or distorting the incoming information. The result is a rejection of the new information. Consequently, strongly held beliefs filter new information and remain stable. Sometimes, the emotion is not so strong, especially when the ‘Self’ is not concerned or involved in the new information. Hence, his or her perception or interpretation of the new information or belief is not strongly affected by the affective component. Instead of distorting or denying the new information or belief, the person will consider the possible outcome or goal to be achieved by trying the new information or belief. When a person has an intention for action or behaviour to try the new information or belief, the conative component operates. The decision of choosing the alternatives for action is facilitated by the evaluative component.

Decisions about alternatives involve a comparison of the value of existing belief and a new one and this is done by the evaluative component of the belief structure. Matching of desirable goals attained is the criterion for comparison of the existing belief and the new one and this matching determines the conation or intention for behaviour or action. Matching also determines the decision whether there is an alternative choice and hence leads to the acceptance or rejection of new information or a belief. If desirable goals cannot be attained by trying new information, a person will reject the new information and strengthen one’s original belief that the new one is of no value or inappropriate. If in trying the new information, it matches and attains the goal, the evaluative component will compare the effectiveness of the outcomes achieved by the new one and that of the existing belief. If the two do not differ widely, the value of the new one is ascertained and subsequently the new information or belief will be assimilated into the existing belief. If a person is convinced that the outcomes (or the value) of the new information are much better and more appropriate than the existing ones, then acceptance of the new information or belief is effected through accommodation with modification or replacement of the original belief. Thus, seeing a successful outcome in trying new activities or practice may be one way to change one’s inherent beliefs. Evidence of this sort has been reported in Guskey’s (1986) study of the impact of staff development program on teachers’ beliefs. In the study, Guskey found that staff development activities were most effective at changing beliefs when teachers could be helped to adopt a new practice and could see that it was successful. Guskey (1986) suggests that belief change follows, rather than precedes, change in behaviour. However, this does not usually happen because, to accept new information through accommodation means that a person must be dissatisfied with the initial belief and have strong faith in the new one. Very often, an initial belief in particular, an early
belief, is deeply embedded in the belief system and is resistant to change. Therefore, in spite of the realities and contradictions encountered, a person may still persist with strongly held beliefs, and reject a new one by denying the reality and distorting the image of the situation. The “Denial” self defensive mechanism can be taken as an example when a person denies what has happened, claiming that it is not true despite it’s occurrence to maintain integrity of his or her original belief.

The proposed five components (cognitive, affective, evaluative, identification and conative) of belief structure explain the function of beliefs. The structure explains how a person (e.g. a teacher education student) reacts towards new information or belief in the presence of existing beliefs. The arrangement of beliefs and their relation with one another can be understood with a knowledge of a hypothetical belief system described in the next section.

A Hypothetical Belief System

The hypothetical belief system is adapted from the ideas of Rokeach (1968) and Roseman (1994). The belief system is an ecology of all the beliefs held by an individual. Within the system, there are many beliefs, such as beliefs about values, beliefs about authority and freedom, beliefs about knowledge (epistemological beliefs), beliefs about teaching and learning (educational beliefs) and beliefs about self-efficacy. The situation is likened to the existence of many planets in a solar system of the universe. Just as planets are related to each other in a gravitational network, in a belief system, individual beliefs are related to each other in a network structure.

Within this network, the strength of any particular relationship is determined by the number of elements shared by the individual beliefs. Further, those beliefs formed early in life form the central part of the network. These beliefs are often descriptive in nature and are resistant to change. Beliefs based on personal experience are often most salient and located in the centre of the network. For this reason they are difficult to change and are often the building points for other related beliefs.

Conclusion and Suggestion

To conclude, this paper gives a literature review on the distinction between beliefs and knowledge, and researchers’ findings and hypothesis on belief structure, function and system. Based on these ideas, the author has done an integration and adaptation to develop his own hypothetical framework to propose a five component belief structure, accounting for its nature and functions and an accompanying belief
system to suggest/explain for learners such as student teachers’ reactions and behaviour in learning. Through analyzing the belief structure and relating individual’s reaction and behavior to teaching and learning activities, teachers, educators and researchers might develop insights and be aware of the significant roles played by beliefs in learning. In turn, they could consider how to make use of the nature ad structure of beliefs in planning and designing curriculum and teaching so as to facilitate students’ learning in the implemented activities with full acceptance and support from the participants.

References


Fenstermacher, G.D. (1994). The knower and the known: The nature of knowledge in
research on teaching. Review of Research in Education, 6, 157-185.
introduction to theory and research. Reading, MA: Addison-Wesley.
Preservice teachers’ professional perspectives. Teaching & Teacher Education, 4,
121-137.
Educational Researcher, 15(5), 5-12.
Curriculum Studies, 19(4), 317-328.
Pajares, M.F. (1992). Teachers’ beliefs and educational research: Cleaning up a
of a scientific conception: Toward a theory of conceptual change. Science
Education, 66, 211-227.
Richardson, V. (1996). The role of attitudes and beliefs in learning to teach. In J.
Sikula (Ed.) Handbook of research on teacher education. (2nd ed., pp. 102-119).
New York: Macmillan.
Rokeach, M. (1968). Beliefs, attitudes, and values: A theory of organization and
Roseman, I.J. (1994). The psychology of strongly held beliefs: Theories of
ideological structure and individual attachment. In R.C.Schank & E. Langer
(Eds.), Beliefs, reasoning, and decision making-psycho-logic in honor of Bob
Tillema, H.H. (1995). Changing the professional knowledge and beliefs of teachers:
A training study. Learning and Instruction, 5, 291-318.
Weinstein, C.S. (1988). Preservice teachers’ expectations about the first year of
Journal of Teacher Education, 40, 53-60.