

: EXPLORING THE BELIEFS OF ELEMENTARY SCHOOL TEACHERS
CURRENTLY IMPLEMENTING THE CONTINUOUS ASSESSMENT COMPONENT
OF THE SECONDARY ENTRANCE ASSESSMENT PROGRAMME IN TRINIDAD

EDRS 6900: RESEARCH PROJECT.

Submitted in Partial Fulfillment of the Requirements for the Degree of

Masters of Education (Curriculum)

Of

THE UNIVERSITY OF THE WEST INDIES

MAHINDRANATH MAHARAJH

2015

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Acknowledgement

I wish to express my deepest gratitude to my very patient and supportive supervisor, Dr. Dorian Barrow who has stood by my side throughout and to those very dedicated and supportive lecturers of the School of Education at the University of the West Indies, St. Augustine Campus, all of whom have brought me in their own way to the point where I can bring together all this wealth of information to bear upon my research. To Reena, our hard-working secretary at the Office of Graduate Research and Studies, I do express my heartfelt thanks for her subtle words of encouragement and gentle expressions of belief in my ability to complete my study.

To my wife, Tara, who has stood by my side all these years, and who has sometimes carried all the burdens of family life by herself throughout my studies, my undying love and gratitude to her. May God continue to bless her with health and happiness. Finally, to that Supreme Being, for giving me the strength and patience to not neglect my job, my family and my home and to still complete this degree, I pay my humblest and most solemn obeisance. Thank you Shree Raama, Bajraang Bali, Devi Maataa.

Abstract

This research paper came out of an abundance of confusion, conflict and disenchantment that pervaded the primary school system upon the introduction of the Continuous Assessment Component of the Secondary Entrance Assessment (C.A.C.), a placement assessment that is used to determine the secondary school that a student is assigned to in Trinidad and Tobago.

Despite the negative issues, many still saw the new curriculum policy as a step in the right direction and supported it in principle. This research explored one of the possible causes of the furor; the alignment of the epistemological, ontological and axiological beliefs inherent in the curriculum with those that inform the pedagogical practices of the teacher implementing it in the classroom. Using a single-case qualitative approach these beliefs were explored in one teacher at a single primary school in the St. George East Educational Division.

The study revealed there was great correlation between the beliefs held by the teacher and those inherent in the curriculum documents. However, it revealed some deficiencies in the balance of values needed for what Huebner, (1975), termed a balanced curriculum.

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Chapter 1- Introduction

The rapidly changing face of education in Trinidad and Tobago is the apparent result of the educational planners and government officials' response to the many perceived human failures coming out of the school system and entering the world of adulthood seemingly unprepared and misdirected resulting in the many negative social issues that seem to be stifling the progress of a multicultural, multiethnic yet peaceful and tolerant society. For education to effectively play its part in the uplifting of our society by assisting in the minimizing of the many social issues, it is absolutely essential that the many proposed changes exhibit scale, a concept that Coburn (2003), describes as having four interrelated dimensions; depth, sustainability, spread and shift in reform ownership. Scaling up a reform initiative involves attending to the four dimensions which according to Coburn, (2003), 'not only requires spread to other sites, but also consequential change in the classroom, endurance over time, and a shift such that knowledge and authority for the reform is transferred from external organization to teachers, school and district' (pg. 4). The present study proposes to examine what might be termed, the most covert aspect of change that can easily be overlooked yet it is believed by researchers that it impacts quite substantially on the effectiveness of any policy change such as curriculum innovation (Beck et al.,2000; Cronin-Jones, 1991; Haney, Czerniak & Lumpe, 1996; Markic, Abu-Hola & Eilks, 2011; Pajares,1992).

Background to the Problem

Albert Bandura, in his book *Social Foundations of Thought and Actions: A social cognitive theory* (1986), states: ‘People regulate their level and distribution of effort in accordance with the effects they expect their actions to have. As a result, their behaviour is better predicted from their beliefs than from the actual consequences of their actions’ (cited in Pajares, 1992 : p.324). This has far-reaching implications as it suggests that the very essence of education, pedagogy, becomes a direct function of a teacher’s belief system or educational beliefs about (as termed by Pajares, 1992) which includes beliefs about self-efficacy, teacher efficacy, epistemology, ontology, motivation, cultural and contextual beliefs; that is, just about any of the myriad of beliefs that impact on the educative process, that are part of the teacher’s experiences. Furthermore, despite curriculum policy planners’ efforts to justify that the reforms can impact positively on students’ performance, it is, according to Bandura’s thesis, the teachers’ beliefs that will eventually determine quality of implementation.

According to Wallace and Priestley, (2011), ‘the relationships among teacher beliefs, teaching and reform based changes have been explored for many years, with the most common result being that teachers transform reforms according to their own beliefs (Cuban, 1998, Van Driel et al., 2001 and Yerrick et al., 1997’, (p.4). Tobin, Tippins and Gallard, (1994), as cited in Markic, Abu-Hola and Eilks, (2011), argue that ‘successful reforms must take teachers’ beliefs into account if they aim at overall change in classroom practices’ (p.186); so the importance of giving due consideration to this aspect of curricular reforms cannot be overstated in spite of its highly implicit and covert nature. Coburn, (2003), argues in her re-conceptualizing of the issue of scale that there are four dimensions; depth, sustainability, spread and shift in reform ownership. Coburn further explains, ‘because teachers draw on their prior knowledge, beliefs

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and experiences to interpret and enact reforms they are likely to gravitate towards approaches that are congruent with their prior practices, focus on surface manifestations (such as discrete activities, materials or classroom organization) rather than deeper pedagogical principles and graft new approaches on top of existing practices without altering classroom norms and routines'(p.4). Changes must go beyond surface manifestations to alter teachers' beliefs, pedagogical principles and norms of social interactions. The beliefs held by the teachers themselves are said to be influenced by their gender, social class, previous experience in the classroom both as a student and teacher, professional training and other historical and biographical factors (Osborn et al. cited in Wallace and Priestley, 2011, p.360). This accounts for the varying beliefs held by teachers who have undergone similar training and work in similar contexts. Samuelowicz and Bain, (1992), cited in Markic et al., (2011), found that beliefs of the same individuals sometimes appear contradictory and dichotomous with teachers showing opposing beliefs simultaneously. This was explained by the fact that teachers can vary their beliefs depending on the content matter to be taught and the context.

The manifestation of the effects of teachers' beliefs on the implementation of the Continuous Assessment Component of the Secondary Entrance Assessment (C.A.C.) in the classrooms of a school in which the researcher is employed was observed. As outlined in the research done by Coburn, (2003) and Samuelowicz and Bain (1992), teachers' greatest efforts went into adapting the proposed curriculum changes in order to assist children to produce high quality assessment pieces such as the art/craft, agricultural science and creative writing portfolios. These adaptations took the form of students observing various activities in science and agricultural science instead of doing and, being told what to write in their report booklets instead of formulating their own responses. In the art/craft area, students were shown the

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necessary skills without understanding the concepts involved. It seems that these adaptations were undertaken because of teachers' self-efficacy beliefs relevant to the content and pedagogical practices required in particular subject areas and possibly their own epistemological, ontological and axiological beliefs.

Changing beliefs have been shown to be as a result of extensive induction programmes in education (Luft, 2009 cited in Markic et al.). In the Trinidad and Tobago context, however, it may be that many teachers return to their pre-training practices, despite the belief changes inspired by such training because of various contextual factors such as unavailability of support and resources, demands of their limited time for discipline matters, inter-school competitions and activities, the examination-based nature of our education system, infrastructural barriers, administrative indifference for one reason or the other and a lack of non-contact time in the primary system. Further research in this area is needed to fully explore this issue. With respect to the C.A.C. itself, very little time was paid to proper training in the various content areas (one-half to three days) and hence very little opportunity to have teachers confront their existing beliefs and evaluate their pre-existing pedagogical practices.

The Context

For many years there have been increasingly numerous requests through public opinion pages of the daily newspapers to change the format of the Secondary Entrance Assessment (S.E.A.) or even suggestions to completely remove it (Express Newspaper: March 9th, 2014; March 11th, 2014; May 8th, 2014). In May, 2012, after the current Minister of Education's (Hon. Tim Gopeesingh) nationwide consultation that was primarily geared to gather information on plans to move the date of the S.E.A. to May of each year, the new curriculum policy initiative, the Continuous Assessment Component of the S.E.A. (C.A.C.) was launched. Utilizing what was mainly the highly criticized 'Top-Down' approach to implementing policy change (Putnam and Borko, 2000; Borko, 2004 as cited in Wallace and Priestly, 2011), the Ministry of Education of Trinidad and Tobago, immediately set about the dissemination process mainly through the Minister's public statements and a few newspaper advertisements.

Teachers of standard five were mandated to attend mass training sessions over a three week period during the school term, a move that met with great criticism from the other stakeholders in education (Trinidad Express, June 26th, 2012; Guardian Newspaper, May 14th, 2012). The initial training sessions appeared to be inadequate with many teachers vehemently opposing the prescribed changes and trainers unable to answer the many critical questions and concerns of the teachers and parents alike. There was mass confusion, fear and despondency over the rushed and poorly conceptualized and disseminated C.A.C. curriculum policy innovation in the primary school system.

While there was no doubt that such changes in the 'one-shot examination' system was long overdue and a welcomed change by all stakeholders, the manner or method of developing,

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disseminating and implementing the revised policy became a sore point for many; possibly even the Ministry of Education (M.O.E.). The recent claim by the M.O.E., that 2012 S.E.A. creative writing national average (12.4/20) was the highest over the past five years reflected the success of C.A.C. (www.news.gov.tt/archive/index.php?news=11303), becomes questionable in the light of Charters and Jones (1973) comment, cited in Fullan, 2007, 'that if careful attention is not paid to whether change in practice has actually occurred, we run the risk of appraising non-events' (pg.46). Measuring this change, according to Fullan, must be done in terms of all three dimensions of change: the possible use of new or revised materials, the possible use of new teaching strategies and the possible alteration of beliefs.

The present study seeks to explore the epistemological, ontological and axiological beliefs that are inherent in the new C.A.C. curriculum document and those held by what is perceived to be a teacher successful in the implementation of the new curriculum and to suggest whether successful implementation can or cannot be claimed truthfully.

The context in which the study will take place is a relatively high performing, denominational, primary school located in the St. George East Educational District. The school has a student population of four hundred and ninety-six (496) and a teaching staff of seven males and eleven females, all of whom are fully trained at least at the Diploma level. The school has enjoyed success in academics, the performing arts and sports over the years and offers a broad-based curriculum to promote the all-round development of its students.

While there is a gallant effort by many of the teachers to engage in constructivist methodologies, integrating technology and improving classroom communication, there are still a few who seem to be stuck in the old transmission teaching mode. With the advent of the

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'Primary Curriculum Rewrite' for infants and standard one and the 'CAC of SEA', the need for change in philosophical beliefs of those still using teacher-centred approaches has become even more urgent and necessary. The use of collaboration and collegiality as a support mechanism has been discussed at staff meetings and encouraged on a day to day basis, with considerable but not total success. Planning of the terms' work and some team teaching has been taking place at the various levels within the school but there are still pockets of resistance.

Although the CAC implementation appears to be well underway, there is generally a lack of enthusiasm resulting in unnecessary delays in teaching lessons and completing assessment tasks by some teachers. At the end of the day, the assessments are done and marks are forwarded to the MOE as required giving the impression of success. However, a closer look at what actually takes place in the classroom may give a better indication of the actual level of implementation.

The Problem Statement

Fullan, (2007) states that curriculum change which is a form of policy innovation must take place along three dimensions one of which is the possible alteration of teacher beliefs.

However, there is some controversy regarding the existence of a relationship between teacher beliefs and curriculum implementation or in some cases, over the nature of this relationship.

Hence while studies done by Beck et al., (2000); Haney et al., (1996); Haney and McArthur, (2002); Hashweh, (1996); Levitt, (2002); Roehrig and Kruse, (2005) (as cited in Savasci – Acikalin, 2009) have concluded that there is a relationship between teacher beliefs and classroom practice, others, (Mellado, 1998; Simmons et al., 1999, as cited in Savasci – Acikalin, 2009) have found no such relationship. A study conducted by Roehler et al., (1988), cited in Pajares, (1992), concluded that ‘knowledge, not belief, ultimately influences teacher thought and decision making’ (p.312).

Furthermore, research in the area of science reform implementation done by Roehrig and Luft, (2004), cited in Savasci – Acikalin, (2009), concluded that strong content knowledge, a contemporary view of the nature of science and student-centred beliefs impacted positively on the implementation of the reform only when taken together, as none in isolation, was predictive of implementation. Additionally, Rokeach (1968) cited in Pajares, (1992), postulated the existence of a belief system in which the individual beliefs lie along a central – peripheral continuum with central beliefs having greater impact on attitudes and behaviours because of their greater connectedness to other beliefs than a peripheral belief. This means that a teacher’s classroom behaviour can be impacted upon by beliefs that are more central in nature and which are not classified as beliefs about teaching and learning thereby further distorting the accuracy of inferences about an individual’s beliefs about teaching and learning.

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This study is specifically aimed at examining epistemological, ontological and axiological beliefs that have informed the approach used in the development of the C.A.C. curriculum document and comparing these beliefs to those held by teachers currently enacting the said curriculum. There is however, much current debate about the nature of epistemological and ontological beliefs both in terms of their conceptualization and measurement. According to Schraw, 2013, ‘from a conceptual standpoint, there is disagreement about the underlying structure of epistemological beliefs ... [there is no] clear articulation of the relationship between personal epistemology and ontology ... and from a methodological standpoint, findings have been inconsistent and measurement problems have been a persistent problem for researchers’ (p.1).

This study also seeks to utilize the knowledge gained from previous research on the issues outlined above and to hopefully contribute in some small way to improving research into educational beliefs but more specifically, it seeks to provide some insight into the apparent success or otherwise of C.A.C. implementation along the beliefs dimension of change in the classrooms of a single teacher at a primary school in the educational district of St. George East.

Purpose of the Study

This generic qualitative study is aimed at determining whether the teacher's interactions with the implementation of the C.A.C. of S.E.A. is influenced by the alignment of his beliefs with those inherent in the C.A.C. of S.E.A. curriculum documents and whether the intended curriculum innovation has been filtered and mediated by the teacher's own beliefs to produce an enacted curriculum different from that intended by the developers. The study assumes Coburn, (2003), concept of *Depth of Change*, Fullan, (2007) and Rogers, (2003), 'Dimensions of Change' in which educational beliefs held by the classroom teacher must be congruent to those in the proposed curriculum for there to be successful change.

The epistemological and ontological beliefs construct used in this study is based on the epistemic and ontological development model proposed by Azevedo, Greene and Torney-Purta, (2010). This model sought to address many of the questions regarding the conceptualization of these constructs, defining the relationship between the two in the educational sphere and thereby clearing up some of the methodological and measurement issues that plagued past research efforts.

Significance of the Study

This study will have the potential to inform better planning of future training sessions for CAC and other policy innovations at the level of the school and could provide a theoretical basis for school-based curriculum policy planners (i.e. administration and school-based curriculum teams) to give adequate consideration to the belief component of curriculum reform efforts. Classroom teachers too at this school, can better understand how their beliefs impact on classroom practice especially during times of change and develop more effective reflective practices to examine how their belief systems impact on their pedagogical approaches in the classroom. Furthermore, it can provide some support for a change in the approach to curriculum innovation, in the context of this school, from top-down to what Wallace and Priestley, (2011), termed ‘contextually- based, co-constructed professional inquiry’ (pg. 359).

The Conceptual Framework

Attitudes and values, both concepts which are directly linked to the beliefs that one holds, and the construct of belief itself, have been a major part of research in fields such as psychology, political science, law, business, anthropology and sociology. The study of self-concept, self-esteem and self-confidence has for a long time been important factors in pedagogical theory as well as social and personality research and has been inextricably linked to good educational practice. The relationship of beliefs to teaching and learning from the perspectives of both teacher and learner has been the focus of much educational research (Beck, Czerniak & Lumpe, 2000; Haney et al., 2002; Kapanadze & Markic, 2013; Markic, Abu-Hola & Eilks, 2011; Savasci-Acikalin, 2009) resulting in the identification of a number of beliefs such as self-efficacy, subject-specific beliefs, beliefs about learning and teaching, teachers' role in the classroom, students' ability (Cronin-Jones, 1991), context beliefs (Wallace & Priestley, 2011) and the nature of knowledge and reality (Olafson, Shaw & Vander Velt, (2010).

This section will first seek to delineate research-based evidence that establishes a clear relationship between educational beliefs and curriculum policy change and its adoption in the classroom setting. It then focuses on three types of educational beliefs that are of particular interest in the current research; epistemological, ontological and axiological. A theoretical framework that links epistemological and ontological beliefs and another for axiology which will inform the methodology of this study will then be explicated with each belief being clearly defined in as current terms as possible and the constructs underlying each belief described in detail.

Educational Beliefs and Curriculum Change

The relevance of beliefs to the current study is outlined in The Theory of Innovations Diffusion by Everett Rogers, (2003), Michael Fullan's, (2007), Theory of Educational Change and Cynthia Coburn's, (2003), Reconceptualization of 'Scale' as all three researchers posit that beliefs not only impact on the manner in which a change is viewed by adopters but also some of those beliefs undergo change in the process of adoption. The Continuous Assessment Component of the Secondary Entrance Assessment (C.A.C.) is a curriculum innovation that is being examined in the current study with emphasis on the beliefs aspect of curriculum change.

According to Rogers, (2003), diffusion 'is the process by which an innovation is communicated through certain channels over time among members of a social system' (p. 26). Rogers, (2003) further conceptualizes the innovation as an idea such as a curriculum change that is perceived as new by whom it is to be adopted (p.26). An innovation must be spread or diffused by communication and is seen by Rogers to possess the following inherent attributes: complexity, trialability, observability, relative advantage and compatibility. Complexity is the perceived difficulty in understanding and using the innovation while trialability is the extent to which it can be tried and tested on a phased basis without too much investment of time, effort and capital. Observability is the degree to which the results of the innovation can be seen over time. Compatibility is the extent to which the new policy is in harmony with the existing beliefs, values, attitudes, past experiences and needs of the potential adopters and the relative advantage expresses the perceived improvement that the innovation may bring to the social, economic and some personal aspects (such as convenience and satisfaction) of the lives of its adopters. These inherent qualities of an innovation of which beliefs is an integral component of the latter two,

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determines how quickly an innovation will be adopted and explains the importance of possible changes in the beliefs of teachers during the process of adoption.

Fullan, (2007), describes four factors which he asserts, impacts on the implementation process: need, clarity, complexity and quality/practicality. Persons involved in the implementation process must perceive that a prioritized need is being met by the policy innovation and that the need is both significant and progress is being made towards its fulfillment. Fullan explains that a lack of clarity is exemplified in diffuse goals and unspecified means of implementation; ‘teachers and others find that the change is not very clear as to what it means in practice’ (p.104). Implementers of policy change run the risk of false clarity or total confusion if changes are interpreted in an oversimplified manner. The perceived difficulty, the extent of skills required, the degree of alteration of teacher beliefs and the extent of changes in teaching strategies and materials impact on complexity. The quality/practicality of the policy innovation is measured in terms of the adequacy of training and learning materials and support mechanisms supplied for the implementation process. The greater the quality/practicality of the curriculum innovation, the more effective the implementation process becomes.

Coburn, (2003), re-conceptualizes the construct of Scale to include ‘all the challenges of implementing reform documented by decades of implementation research and of sustaining change in a multilevel system characterized by multiple and shifting priorities’ (p.3). Thus instead of the one-dimensional view of Scale as simply the number of schools reached by any given school reform policy, the reconceptualization involves depth, sustainability, spread and shift in reform ownership. The depth of change, according to Coburn, (2003), refers to the ‘[alteration of] teachers’ beliefs, norms of social interaction and pedagogical principles as enacted in the curriculum’ (p.4). Sustainability is the school’s drive in maintaining the change

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over the passage of time despite ‘competing priorities, changing demands and teacher and administrator turnover ... as externally developed school reforms ... typically involves a short-term influx of resources, professional development and other forms of assistance to facilitate implementation that dissipates over time as external developers turn their attention to other sites’ (Coburn, 2003, p.6). Spread refers to not only the spreading of the reform to many classrooms and schools but also the spread of the underlying beliefs, pedagogical practices and social norms within the classroom, school and district. Finally, Coburn asserts that the shift in reform ownership occurs when the reform ‘becomes an internal reform with authority for the reform held by districts, schools and teachers who have the capacity to deepen, sustain and spread the reform principles themselves’ (p.7).

The aim of the current research is to examine the beliefs inherent in the recently introduced Continuous Assessment Component of the Secondary Entrance Assessment (C.A.C. of S.E.A.), a primary school curriculum initiative that required substantial changes in the teaching, learning and assessment practices at primary schools in Trinidad and Tobago. Furthermore, the marks of the subjects assessed at the C.A.C. is set to contribute forty percent to a student’s total score at S.E.A. (Secondary Entrance Assessment) which is a high stakes examination used to determine placement of students into secondary school, rendering the C.A.C. an ascribed importance, at least in the minds of teachers, pupils and parents, almost equal to the S.E.A. itself. These inherent beliefs will be compared to the beliefs apparently held by one teacher as he implements the C.A.C. in his classrooms, in order to evaluate the success of the reform effort in terms of the beliefs dimension that has been shown to be an essential contributor to curriculum policy change. The question that now comes to the fore is; of all the beliefs being researched, which will be relevant to the current context and methodology? The research,

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(Brownlee, 2004, Marra, 2005 and Trumbull et al. 2006 as cited in Olafson, Shraw and Vander Velt, 2010) suggests that epistemological, ontological and axiological beliefs will be most salient as these are not only perceivable through examination of the curriculum document, and through observation, survey and interview of the teacher, but these are the beliefs inherent in curriculum from the initiation phase to the implementation phase (see Fullan, 2000 for a full description of the phases of curriculum reform). According to Macdonald, (1975), 'The curriculum theorist is always involved in assumptions and implicit (if not explicit) statements which could be classified ... as ontological, axiological, and epistemological (cited in Ladd, 1995, pg.31).

Epistemological and Ontological Beliefs

Epistemological beliefs as they relate to education have been the source of much debate by researchers for many years (Greene, Azevedo & Torney-Purta, 2008, 2010; Hofer and Pintrich, 1997; Schraw, 2013) resulting in the identification of a few critical issues that could have negatively impacted the validity of past research in this area. These issues include whether developmental models (Baxter Magolda, 2004; King and Kitchener, 1994, 2004; Kuhn, Cheney and Weinstock, 2004 as cited in Greene et al., 2008) or 'system of beliefs or multidimensional' models (Hofer and Pintrich, 1997; Schommer-Aikins, 2004, as cited in Greene et al. 2008) best represent epistemological beliefs, the range of constructs that are really epistemological in nature, the degree to which these constructs are specific to one domain or of a more general nature, how to best capture these constructs using measurement instruments and how to best model their development (Greene et al., 2008, p. 143). Furthermore, Schraw and Olafson, (2008), noted that it is crucial that both epistemological and ontological beliefs be measured on the same scale as 'from a methodological perspective...it is unclear how epistemological and ontological beliefs are related to one another, to student achievement, or to teachers'

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instructional practices' (p. 30). There has, in fact, been much emphasis on epistemological beliefs research without giving due consideration to ontological beliefs (Schraw and Olafson, 2008, p. 30)). Thus the development of a conceptual model that relates epistemology to ontology is a seemingly important goal along with the concurrent development of a survey instrument that will produce scores that are reliable and valid as indicators of epistemological and ontological beliefs as they relate to the process education.

Greene et al. (2008), proposed to deal with these issues by turning to philosophical epistemology as a starting point to first define the constructs that represent true epistemological beliefs. However, their focus was classical philosophical epistemology and admitted that 'social interpretations may also yield valuable insights regarding how individuals view knowledge and knowing' (p.149). Hofer, (2002), cited in Greene et al., (2008), describes philosophical epistemology as being 'concerned with the origin, nature, limits, methods and justification of human knowledge' (p.148). Pollock and Cruz, (1999) and Williams, (2001), as cited in Greene et al., (2008), explains that the nature and limits of knowledge, one of the constructs of epistemological beliefs referred to above, does not semantically relate to any structural perception of knowledge such as simple or certain, (as suggested by Schommer-Aikins, 2004) but rather the types of claims that can be justified as knowledge whether by appealing to rationality or the work of authority figures, sense data, evaluating coherence with other established claims or other means too numerous to mention. Greene et al. further explain that what epistemological researchers of schooled knowledge (those who research educational beliefs) '[try] to capture with the nature of knowledge factors is the idea that people have varying beliefs regarding the categories and attributes of knowledge claims in academic domains and that their understanding of them develops over time'(p. 149). According to Greene et al.,

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‘philosophical ontology is the study of the mutually exclusive, necessary and sufficient categories (also called classifications) of reality’ (p.149) and that these different means by which student use to understand knowledge claims within domains concern the realm of ontology. Thus the construct simple knowledge, an epistemic dimension proposed by Schommer-Aikins, (2004), should rather be referred to as simplistic ontology in which students assign knowledge to limited and sometimes unhelpful categories such as placing the concept ‘heat’ in the category of ‘substance’ in the domain of physics. Certain knowledge, the other dimension of Schommer-Aikins’ nature of knowledge epistemological beliefs construct, refers to the belief that knowledge claims in the classifications of reality or ontological categories discussed above have the potential of either changing over time or remaining relatively static depending on the category itself.

A claim is given the status of knowledge if ‘it is justified, true and the person believes it’ (Green et al., p.248). Pollock and Cruz, (1998), as cited in Greene et al. describe the construct, origin of knowledge, thus, ‘What we want to understand is rational thought, from the routine to the sublime...we want to understand human beings as cognizers...our interest here is in specifically rational cognition’ (p.248). Thus knowledge, as theorized by philosophical epistemology, is created in the human mind but can be justified by external means thus annulling any conception of knowledge existing outside the human mind. It therefore follows that if an individual’s notion of knowledge is a collection of facts existing externally and waiting to be perceived then such a stance can be considered ‘anti-epistemological’ and indeed such a construct as the nature of knowledge as espoused by Schommer-Aikins, 2004, cited in Greene et al., as an epistemological construct is inappropriately assigned and should be ontological instead, where it speaks to a person’s view of the nature of reality. In fact, Greene et al., (2008), declare,

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‘We agree with Kuhn, (1999) and King and Kitchener, (2004) that a person must have a sophisticated ontology of a domain before epistemic cognition and issues of justification become relevant at all’ (p. 250). Hence it appears that there exists a relationship between ontology and epistemology in which there is apparently a predictive relationship between the nature of knowledge factors and epistemological beliefs. Greene et al., (2008, 2010), further declare that the use of the terms epistemic and ontological cognition better capture that which are represented by the epistemic and ontological beliefs

This study proposes to utilize the Epistemic and Ontological Cognition Development Model (EOCD) (see Figure one) developed by Greene, Azevedo and Torney-Purta, (2008), which brings together the ‘developmental’ and ‘systems of beliefs’ models of epistemological beliefs that have dominated educational research for many years. Furthermore, this model proposes an apparently credible relationship between epistemological and ontological beliefs as they relate to educational beliefs such as those inherent in curriculum policy and it posits four different positions each of which has a discernible profile of ontological and epistemological beliefs.

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	<i>Ill-Structured Domains</i>				<i>Well-Structured Domains</i>			
	<i>Position</i>	<i>SC</i>	<i>JA</i>	<i>PJ</i>	<i>Position</i>	<i>SC</i>	<i>JA</i>	<i>PJ</i>
<i>Age/Educational Level</i> ¹								
4–12	Realism	Strong	Strong	Strong	Realism	Strong	Strong	Strong
12–early college	Dogmatism or Skepticism	Weak	Strong	Weak	Realism	Strong	Strong	Strong
Middle to late college	Rationalism	Weak	Moderate	Moderate	Dogmatism or Skepticism	Weak	Strong	Weak
Postundergraduate education	Rationalism	Weak	Moderate	Moderate	Rationalism	Weak	Moderate	Moderate

Note. SC = Simple and Certain Knowledge dimension; JA = Justification by Authority dimension; PJ = Personal Justification dimension.

Figure 1. The Epistemological and Ontological Development Model (Greene et. al.,2008, 2010). The model proposes to incorporate the systems of beliefs and developmental models of Epistemic Cognition.

The model predicts that most persons begin at the ‘realist’ position in which the student interprets knowledge using limited and sometimes unhelpful or inappropriate ontological categories ,that is, a simple view of knowledge and it is also believed that these bits of knowledge are relatively unchanging or certain. The realists believe that knowledge is a direct copy of reality, it is either right or wrong and any disagreement can be resolved by an appeal to

¹ We have used both age and educational level terms in this table given their predominance in the personal epistemology literature but acknowledge that they are not ideal, particularly because the latter are not inclusive of individuals who do not attend college.

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the facts. Justification comes from one's own experience or that of an authority figure although no such justification is necessary for a realist to classify anything as knowledge. According to Greene et al., (2008), 'every other position in the model (i.e. dogmatism, skepticism, and rationalism) has a more complex ontology where knowledge categories are not simple and certainty is but one possible attribute' (p.159). As the individual's ontological beliefs becomes more complex, the issue of justification of knowledge becomes increasingly relevant. An individual who has strong belief in justification by authority is referred to as a dogmatist whereas one who shows weak belief in this dimension and gives strong endorsement to personal justification is described as a skeptic in this model. It is assumed here that if one has strong belief in justification by authority then there is a concurrent weak belief in personal justification and vice versa. As epistemic development continues with an accompanying increase in the number of ontological categories that individuals can now use to interpret and assign bits of knowledge, persons move into the rationalist dimension. Here increased use is made of other forms of justification and both personal and justification by authority dwindles to moderately important.

The EOCD model seems to account for the differences in epistemological and ontological development between well-structured domains and ill-structured domains (Donald, 1990) that have been posited by researchers (Buehl & Alexander, 2001, 2005; Buehl et al., 2002; Hallett et al., 2002; Muis et al., 2006, as cited in Green et al. 2008). According to Hofer & Pintrich, (1997), 'the meaning and boundary of *domain* is problematic' (p.125). Nevertheless, Alexander, (1992), as cited in Hofer & Pintrich, (1997), 'describes domain knowledge broadly as individual knowledge about a particular field of study, encompassing declarative, procedural and conditional knowing ... [and asserts] that the difference between domain knowledge and discipline knowledge is at the individual level, dependent on the extensiveness and organization

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of knowledge' (p.125). The research has claimed that there are marked differences in epistemological and ontological cognition across domains and therefore the domain generality assumed by many models (Baxter Magolda, 1992; Belenky et al., 1986; King & Kitchener, 1994; Kuhn, 1991; Perry, 1970; Schommer, 1994 as cited in Hofer & Pintrich, 1997) has been questioned by many (Muis et al., 2006; Buehl & Alexander, 2005; Buehl, Alexander & Murphy, 2002).

Axiological Beliefs

Axiology is the study of values as it relates to ethics or human conduct and aesthetics or the determination of what is beauty (Hussain, Mobeen & Saieed, 2011, pg.1923). Rokeach and Ball-Rokeach (1989) define values as 'the conceptions of desirable ends and means of action' (cited in Ladd, 1995, pg. 14) and Schwartz (1990) adds that 'values operate at the level of individuals, institutions, and entire societies' (as cited in Ladd, pg.14). Schubert (1986) attests to the relevance of axiology to curriculum studies, '...certainly all curricula prescribes what ought to be done, [so] the centrality of ethics and axiology becomes indelible...The nature of the good life, a basic philosophical question, thus lies at the heart of all curricular decision and action' (cited in Ladd, 2011, pg. 31). Huebner, (1975) developed a framework for classifying axiological values into five categories: technical, political, scientific, aesthetic and ethical which was described by Hyde, (1987), as having 'great explanatory power for linking values, theories and programmes' (pg. 133) and therefore it will be used as the theoretical base for grounding the research on axiological values in this project.

The technical value system is very well exemplified in the Trinidad and Tobago national curriculum today. The curriculum begins with overarching aims and objectives of education and these are broken down into general and specific objectives in distinct subject areas with

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prescribed activities, resources and teaching / learning strategies all aimed at achieving these objectives as universally as possible. Huebner (1975) asserts that these ‘ends or objectives are identified by a sociological analysis of the individual in the present or future social order [and] then translated into psychological language – usually in terms of concepts, skills, attitudes and other behavioural terms’ (pg. 223). The degrees to which these aims and objectives are met are tested by various forms of assessment including state sanctioned standardized tests. According to Huebner (1975), ‘evaluation, from the point of view of the technical value system, may be considered a type of quality control’ (pg. 223). ‘Technical valuing and economic rationality are valid and necessary modes of thought in curriculum [but] to reduce all curricular thought to this one is to weaken the educator’s power’ (Huebner, 1975, pg. 224).

The second category, political, exists because of the power relationships that are inherent in the realm of the education system. The teacher can exert influence over his students by manipulating what is taught, the communication climate he encourages and/or the resources he makes available to the students. A teacher’s success or otherwise in the classroom is what others use to judge him so it can be decided whether those others would support, respect and reward him. This relationship results in educational activity being greatly valued by the teacher (Ladd, 2011). These power relationships will also extend to administration, school inspectorate, denominational boards in the local context and the Ministry of Education and its representatives. The Ministry of Education determines what is to be taught and resources are made available to schools and performance is measured and used to exert influence on what happens at the school. National Test and its descriptive markers; academic emergency, academic watch, mostly effective and excelling, not only label the school but are also used to determine the kinds of resources made available and the extent of close supervision and control exerted by the Ministry.

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The Scientific is the term used to identify the third dimension of Huebner's axiological framework, and according to Hyde (1987), 'seeks the production of new knowledge through empiricism. Inquiry and knowledge are valued in their right rather than as instrumental for another purpose' (pg. 133). This type of valuing manifests itself in experimental, problem solving and research based pedagogical approaches to learning where students interact with new learning experiences and so are very much involved in the processes of learning.

The Aesthetic category is described by Huebner (1975) as the most ignored as very few value education as something with symbolic and aesthetic meanings and more so in the words of Ladd (2011), 'only rarely is the possibility and significance of life symbolized through educational activity' (pg. 34). Huebner identifies three dimensions of aesthetic valuing; psychical distance, wholeness and design and symbolic meaning. Psychical distance accounts for educational activity being valued as an aesthetic object in itself and not as an instrument geared to the achievement of further goals and hence this activity becomes something symbolic to be engaged in by all unconditionally. Wholeness and design, the second dimension within the aesthetic category, allows for the evaluation of the educational activity, in terms of its 'sense of wholeness, of balance, of design and of integrity and its sense of peace and contentment' (Huebner, 1966 cited in Ladd, 2011, pg.34). Thus educational activities that are judged as exciting, fulfilling, encompassing beauty and truth will find worth under this dimension. And finally, symbolic meaning refers to educational activities 'felt and valued by educators' (Huebner, 1966 cited in Ladd 2011, pg. 34). The value of an educational activity is symbolic and intrinsic to the activity itself because of the kind of truths and meanings it brings to the learners; truths and meanings which may be most valued by educators as being essential for an individual's education.

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The ethical values category views educational activity through the lens of the metaphysical, moral and even religious or religion based concepts. This aspect of Huebner's framework is concentrated on the quality of human interaction as it occurs in the educational activity. Huebner (1966) cited in Ladd (2011) explains it thus, 'the educational activity is life-and life's meanings are witnessed and lived in the classroom' (pg. 34). Therefore the value of an activity is best when the moral/ethical constructs such as respect, cooperation, sharing, honesty, integrity and others are inherent in the interactions.

The Huebner, (1975), framework will be used to analyze the axiological values in the CAC curriculum document and those apparently part of the teacher's value system as part of the methodology that is aimed at determining if the beliefs of the teachers and those inherent in the curriculum document are one and the same.

The conceptual framework outlined above for each category of beliefs to be measured in the study i.e. epistemological, ontological and axiological, will serve to ground the study in a relevant theoretical base and provide a basis to design and/or select data collection instruments and the means by which to interpret the information gathered.

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The Research Question

Are the beliefs of one teacher who is currently implementing the CAC of SEA in a standard four class at a particular school in the St. George East Educational District congruent with the beliefs inherent in the curriculum policy as intended by the developers?

Sub-Questions.

What are the epistemological, ontological and axiological beliefs inherent in the curriculum documents produced by the CAC developers?

What epistemological, ontological and axiological beliefs underpin the pedagogical practices of the teacher currently successfully implementing the CAC curriculum innovation?

Limitations of the Study

The limited time available to conduct a study like this will inevitably affect the validity and reliability of the final results as the data collection cannot be extended to other contexts and the sampling cannot be inclusive of gender, location, socio-economic status and personal characteristics (academic qualifications, experience, teaching levels) considerations so as to enhance both within and cross case analysis. The case study approach used gives an in-depth analysis of a single case in a limited context and hence cannot be generalized. One individual of a single school will be interviewed and observed given the constraints of the researcher being a full time employee and not an itinerant researcher. I am thus unable to extend my attempts to other schools and /or teachers. Rokeach (1968) cited in Pajares (1992), explained that the nature of beliefs is such that it requires inferences to be made from what individuals say, intend and do as they (beliefs) cannot be directly observed or measured. These inferences are 'fraught with difficulty because individuals are often unable or unwilling, for many reasons, to accurately represent their beliefs' (Rokeach 1968, cited in Pajares 1992, p. 314). Thus the study is limited by the unknown extent to which the measurement of beliefs is assumed accurate. Furthermore educational beliefs, the constructs under study, which is a subset of and interconnected with general beliefs are impacted on by these general beliefs. The study is unable to assess this effect along with those of other educational beliefs that are not included in this study.

Chapter 2- Review of Literature

People regulate their level and distribution of effort in accordance with the effects they expect their actions to have. As a result, their behaviour is better predicted from their beliefs than from the actual consequences of their actions.

-Albert Bandura, *Social Foundations of Thought and Action*

Festermacher, (1979), as cited in Pajares, (1992), predicted that beliefs would become ‘the single most important construct in educational research’ (p.329) and indeed as Bandura observed in the opening quote, beliefs motivate or de-motivate us to accept the changes that are curricular reforms. Pajares, (1992), conceptualizes beliefs as ‘a judgment that can only be inferred from a collective understanding of what human beings say, intend and do’ (pg.316).

This literature review will first discuss the latest trends in educational beliefs research highlighting some of the concerns researchers have with epistemological and ontological educational beliefs and their measurement. It will then seek to review some research conducted to study epistemological, ontological and axiological beliefs and their impact on educational curricular reform in light of the concerns discussed.

Construct Definition Issues

Schraw, (2013), observes that ‘research on personal epistemologies and ontologies has been difficult to conduct and interpret at times for conceptual and methodological reasons. From a conceptual standpoint, there has been disagreement about the underlying structure of epistemological beliefs...there has not been a clear articulation of the

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relationship between personal epistemology and ontology. From a methodological standpoint, findings have been inconsistent and measurement problems have been a persistent problem for researchers' (p.1).

The disequilibrium surrounding the issue of definition of epistemology and the delineation of the dimensions it encompasses has been a major concern for many researchers. For example, Schommer, (1990), proposed five dimensions: certain knowledge, simple knowledge, omniscient authority, quick learning and innate ability. However, many researchers have argued that only simplicity and certainty of knowledge are valid epistemological beliefs and Hofer, (1997), has argued for the inclusion of the origin of knowledge as a dimension (Schraw, 2013, p.2). Greene et al., (2008, 2010), have argued that the dimensions of simple and certain knowledge are better placed under ontological beliefs with simple knowledge having to do with the type of ontological categories that learners use to interpret knowledge claims and not whether knowledge exists as “discrete, concrete and knowable facts” (Greene et al.,2008, p.149) and certain knowledge being indicative of whether knowledge claims change or are relatively static within a specific ontological category. Hofer, (2001), proposed two dimensions, the nature of knowing and the process of knowing. The nature of knowing is made up of the two factors, simple and certain knowledge which were discussed previously and the process of knowing which itself is made up of sources of knowledge, that is, whether knowledge is self or other-generated and justification of knowing, that is, the criteria used to evaluate knowledge claims. Greene et al., (2008,2010), proposed that any person holding the belief that knowledge is other generated seems to be unable to engage in any kind of epistemic cognition as issues of justification becomes irrelevant and thus such beliefs cannot be categorized as epistemological in nature. Pollock and Cruz, (1999) cited in Greene et al., (2008), further ratify the foregoing claim as they explain that

“epistemology has traditionally focused on epistemic justification more than knowledge” (p. 148).

Measurement Issues

In addition to the construct definition issues highlighted above, measurement issues also plague this area of educational research. Schraw, (2013), reported that factor analyses conducted on Schommer's, (1990), Epistemological Questionnaire (EQ) revealed that there were less than five interpretable factors and the presence of factors that were not interpretable using Schommer's conceptual framework. The factors reported in these analyses had low or unacceptable reliability coefficients and there was a relatively large proportion of unexplained sample variance (65-80%) (p.4). A modified version of the EQ developed by Schraw, Bendixen & Dunkle, (2002), as cited in Greene et al. (2008), the Epistemic Beliefs Inventory (EBI), was designed to address these methodological issues but again reliability coefficients were low, results were dependent on age and gender and the EBI could only explain a small proportion of sample variance. Hofer, (2001), proposed a four factor framework and developed the Epistemological Beliefs Questionnaire (EBQ) to measure the factors. Hofer reported four empirically derived factors that showed differences from the factors she proposed and again, there was low rate of explained sample variance, several factors with unsatisfactory item loading and factors with low reliability coefficients. Olafson, Schraw & Vander Velt, (2010), measured teachers' epistemological and ontological worldviews using a four-quadrant scale that was designed to assess both epistemological and ontological worldviews on the same empirical scale. It was found that there were inconsistencies between teachers' reported positions on the four-quadrant scale and their verbal justifications in which they described their classroom practices.

The Epistemic and Ontological Cognition Development Model

Green et al., (2010), proposed and developed the Epistemic and Ontological Cognition Development Model (EOCD) which was designed to integrate the ideas generated in the ‘systems of beliefs’ and ‘developmental’ models of personal epistemology, take into account the ontological stances of individuals and use to further create an instrument, the Epistemological and Ontological Questionnaire (EOCQ), that would seek to eliminate the low reliability and construct validity issues encountered in previous assessment instruments (Greene et. al.2010, p. 236). This model seemed to have produced a unified framework that links epistemology and ontology, which according to Schraw, (2013), would benefit future research (p.1).

The first position on the model is realism in which an individual sees knowledge as an exact copy of reality and it is therefore objectively knowable (Green et al., 2010, p.238). However, Greene et al. (2008, 2010), characterizes this position as strong on the ‘justification by authority’ and ‘personal justification’ dimensions although the issue of justification may not come up at all in the minds of persons who have a simple and certain view of knowledge and are likely to accept a claim as knowledge based on their own experience or that of someone in authority.

The next developmental position proposed by Green et al. (2008,2010) and which is based on research by King and Kitchener, (2004), Kuhn & Weinstock, (2002), and Chandler, Boyes and Ball, (1990) as cited in Green et al., is a pair of polar opposites, dogmatism and skepticism. The dogmatist seeks justification from authority figures whereas the skeptic seeks it from within making knowledge claims subjective and personal. Persons who seek justification in other ways that may or may not include personal and authoritative means, are referred to as

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rationalists and this position appears to be the highest developmental level in epistemic and ontological cognition according to the EOCD.

Greene et al.,(2010), tested their EOCD model by evaluating the psychometric qualities of the EOCQ through the use of confirmatory factor analyses (CFAs) for evaluating the construct validity of the measures of personal epistemology (Kline, 2005; Pett, Lackey & Sullivan, 2003, as cited in Greene et al. 2010, p.236) and used factor mixture modeling (Gagne, 2006; Lubke & Muthen, 2005, cited in Greene et al., 2010) to ‘indicate whether individuals’ patterns of scores across latent factors (i.e. their latent profile) match those hypothesized in the model’ (p. 239). A quantitative approach using 740 respondents of which 68% was female, were chosen from middle and high school, undergraduates and graduates partially eliminating the homogeneity of sampling used in many previous studies. Participants were required to complete the EOCQ without any discussions with peers or any clarification from researchers along with a self-report of their average grades in history (an ill-structured domain) and mathematics (a well-structured domain) and the necessary demographic information. Greene et al., (2010), concluded that the findings supported the conceptual model and the attempt to incorporate the systems of beliefs and developmental models of epistemic and ontological cognition. They further stated that ‘the measurement model had good data-model fit by Hu and Bentler’s, (1999), standards with acceptable levels of construct reliability’ (Greene et al., 2010, p.247), except for one factor, simple and certain knowledge. The evidence also supported the domain specific position of the EOCD, that realists’ beliefs are not as beneficial in learning situations as skeptics, dogmatists and rationalists and that ‘individuals do experience a kind of Piagetian decalage in the development of their EOC’ (Greene et al. p. 247).

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The model appears to be a step in the right direction as far as the modeling and measurement of epistemic and ontological cognition development goes but there seems to be a need to either adjust the questionnaire items to better differentiate between the realist and dogmatist positions, use another form of data collection (eg. interviews) or rethink the conceptual model itself with respect to the simple and certain knowledge dimension as the possibility exist that there are more dimensions to ontological cognition than are being hypothesized in the EOCD.

Previous Research Findings

Wallace and Priestley (2011), investigated the beliefs of teachers involved in an exercise in which collaborative enquiry groups of researchers and teachers designed classroom methods, implemented and evaluated a programme designed to facilitate Scotland's *Assessment is for Learning* (AifL) curriculum reform initiative. A qualitative interpretive case study approach was used in which five groups of secondary school teachers with backgrounds in similar academic domains, supported by a university researcher came together to plan, implement and evaluate a curricular reform initiative for which only guidelines were provided. The research study was framed by Archer's, (1988), Morphogenesis/Morphostasis, a critical social realist theory which posits a realist ontology and a social constructivist epistemology and was used, according to Wallace and Priestley, (2011), 'for describing how knowledge and practice are created in complex social settings such as schools' (p. 362).

Five participants, each belonging to one of the collaborative enquiry groups, were purposely selected based on their positive attitude towards the implementation of the policy. Data collection involved the use of semi-structured interviews, informal interviews and field

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notes from classroom observations. Five themes were derived from the data, one of which can be termed axiological as it spoke to the teachers' beliefs about the purpose of teaching and the other four can be characterized as epistemological/ontological as they subscribed to beliefs that children have innate abilities to learn and both they and their teachers construct knowledge either on their own or in a social setting. The fifth theme which spoke to the open-ended, teacher-led approach to the professional development exercise in which the curriculum change was teacher led is undergirded by an ontological/epistemological belief that persons socially construct their own understanding through meaningful interaction with the curriculum guidelines given by the policy developers.

The use of collaborative enquiry as the vehicle for development and implementation of curricular reforms is well supported by research (Zellermayer and Tabak, 2006; Merrink et al., 2006; Priestley, Miller, Barrett and Wallace, 2010 as cited in Wallace and Priestley, 2011, p.359) and often results in positive beliefs changes with respect to the curriculum reform initiatives. It was found that the collaborative exercises facilitated an exchange of ideas and experiences which together with purposive classroom experimentation and reflective evaluation produced more lasting change. Wallace and Priestley concluded that when teachers' beliefs are congruent with reform philosophy or the types of beliefs inherent in the reform, and when teachers' efforts to interpret and create the classroom applications of the policy are encouraged, the possibility of meaningful change is better indicated.

The sole use of teachers who were successfully using the approach in their classroom may have impacted negatively on this study. Possibly, by including teachers who were not successfully implementing the reforms in their classroom, despite the fact that they were part of the collaborative enquiry groups, could have provided some very valuable insight into the non-

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implementation of a reform under the given conditions. The study however, provided some deep insight into the effects of epistemological, ontological and axiological beliefs on the implementation of curricular reform policies.

Roehrig & Kruse, (2005), conducted a mixed-methodology study in which they sought to investigate the effects of Living by Chemistry (LBC), a reform- based curriculum in the process of being field-tested using a top-down implementation approach, on the classroom practices of twelve senior high school teachers of a single district and the impact of their (teachers') beliefs and knowledge on the implementation process. Information regarding teacher beliefs was collected using semi-standardized interviews (Teacher Beliefs Interview and including questions from the Teachers' pedagogical Philosophy Interview, Richardson, 1994) at the beginning and end of the pilot study. Observations of classroom practice were done prior to the implementation using non-LBC units and during implementation of the LBC using a modified version of the Reformed Teaching Observation Protocol (Sawada et al., 2002).

After plotting graphs with initial teacher beliefs vs. non-LBC observation scores and another on initial teaching beliefs vs. LBC observation scores, Roehrig and Kruse, (2005), found that the Pearson's correlation test produced a coefficient of 0.76 (sig. = 0.0038) and 0.81 (sig. = 0.0015) respectively concluding that 'there is a clear statistical relationship between teachers' beliefs about teaching and learning and their classroom practice both in the presence of or absence of a reform-based chemistry curriculum' (p. 417). Their analysis of the scores from the RTOP showed that five teachers demonstrated small changes in classroom practice (RTOP change <10) and seven showed large change (RTOP change > 15), that teachers with the highest levels of reform-based practices also seemed to have had the most reform-based beliefs; beliefs, according to Roehrig & Kruse, (2005), 'were also critical in the implementation of the

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curriculum and associated instructional strategies' (p. 420). They also found that teachers holding the more traditional (teacher-centred) beliefs showed low levels of implementation and very little change in classroom practices. They further indicated in their findings that content knowledge seemed to play a key role in teachers' classroom practices and the implementation process with out-of-discipline teachers reporting that 'their lack of chemistry knowledge affected their ability to plan inquiry-based chemistry lessons and their comfort in teaching certain chemistry topics' (p. 420) and thus the LBC seemed to have provided the necessary support to facilitate the enactment of reform-based classroom strategies.

Roehrig & Kruse, (2005), study sample involved 12 participants and this could have led to a Type 1 or Type 2 error and also seemed to have been too small to allow for generalization. Their claim that teachers' knowledge of the chemistry content seemed to be a barrier to implementation could have been misinterpreted as they carried out no measurement of content knowledge. Possibly this could be pointing to poor self-efficacy beliefs on the part of those teachers. This research study contributed to the understanding that beliefs do not change in the short term although the classroom practices did and it showed that traditional teaching beliefs or transmission type beliefs seem to reduce a teacher's openness to curricular reforms.

The only research study in the area of ontology that was found and had sufficient relevance to the current research was carried out by Slotta and Chi, (2006), in which a control and an experimental group of participants were both pre-tested then trained in a physics concept (electricity) and post-tested using the same test, to measure any change in their understanding of what was taught. Prior to the physics instructive package, the experimental group was given ontology training in the category of emergent processes (with no reference to electricity) and tested for their understanding of the training whereas the control group received a training

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module that used the same medium (computer interface), and involved the same air expansion and liquid diffusion topics which were used in the ontology training for the experimental group but was based on conceptual understanding and not geared towards the learning of the four attributes of the ontological category, emergent processes, which had been determined previously by Slotta and Chi, (2005, p.270).

The target group consisted of 24 undergraduate students with no university science background and no formal training in electricity. Their answers to the items were followed by a written explanation for their choice of answer as a check against recall from the pretest or guessing of an answer and, more importantly, so that these explanations could be analysed and coded to determine whether the replies reflected a substance or emergent process ontological category.

The results showed that the ontological training which served to help students understand the more complex category of emergent processes in which concepts such as electricity, heat and force can be better understood produced a 29% improvement in scores against a 6% improvement over participants in the control group. Slotta and Chi, (2005), indicated in their discussion that many students tried to interpret electricity and other complex physics concepts using key features of the substance ontological category (see p. 264 for features) leading them to assign to these concepts properties associated with substances instead of emergent processes (p.286). It was recommended that persons involved in curriculum 'must first discern whether a concept is likely to have been ontologically misplaced by a student then proceed with a two-phased approach' (p.287), much like that used in their research.

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Slotta and Chi's, (2005), conception of the ontological categories is an integral part of the Epistemological and Ontological Cognition Model (EOCD) proposed by Greene et al., (2008, 2010), and which forms the theoretical basis of the current research. Although the sample size was a bit small the study showed that an individual's ontological stance must be more complex to accommodate epistemic cognition where knowledge is constructed in the human mind, whether socially or individually, and one must seek the kind of justification needed to determine what he/she accepts as a knowledge claim. Thus the training provided in Slotta and Chi's research developed the complex ontological cognition needed for the participants to accommodate through epistemic cognition (justification) the knowledge claims inherent in the concept of electricity.

Ladd, (1994), in a doctoral thesis aimed at examining the values inherent in one of the models of William Spady's Outcome Based Education, 'The High Success Program on Outcome-Based Education' and at describing the values of teachers who have implemented this curriculum in one school district in Oklahoma utilized ten teachers as participants in the study were shortlisted from a list of fourteen chosen by the county superintendent from then current employees of the district. The participants had all attained a minimum educational level of a Bachelor's degree with four persons attaining at the Master's level. Their teaching experiences ranged from ten to twenty-seven years and were posted from the elementary to high school grades.

The research design used in the study was an axiology with discourse analysis being used to determine the values inherent in the Spady model and an in-depth interview supported by the Val-Ed survey instrument to delineate the values held by the participating teachers currently implementing the programme. The researcher was interested in determining whether the teachers

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shared the same values as those of the model and also whether they were aware of the values portrayed by the Spady model. It was found that the value categories, in terms of Huebner, (1966, 1975) framework, most prevalent in the curriculum policy documents were of the technological with political values coming in second although it was less than half as prevalent. Aesthetic and ethical valuing were held in the lowest regard. As hypothesized, the teachers held moderate to strong technological and political values, with all but one showing moderate or high aesthetic value. However, Ladd, (1996), indicated that only one definition of aesthetic value as given by Huebner, (1966, 1975), in which this value is indicated, i.e. ‘a sense of wholeness, balance and contentment as a result of educational activity’ (p.90) was used in coding. Ladd, (1996), further states that ‘there was no instance in which the educational activity had the characteristics of physical distance or symbolic meaning which reveal truth’ (p.90). In fact, Ladd admits that ‘these two elements...may be more indicative of a truer, deeper aesthetic valuing than the type identified in this study’ (p.90). Scientific and ethical values held by the participants held no particular pattern with these values ranging from low to moderate to high. Interestingly, five teachers appeared to hold a balance of all five of Huebner’s values which according to him, ‘are neither bad nor good [but] a balance is ... desirable in any system of education’ (cited in Ladd, 1996, p. 87).

This research once again appears to confirm that there must be some congruency of beliefs that are inherent in a curriculum and those held by teachers who are implementing it in the classroom, however the researcher seemed to have missed or not use the opportunity to investigate the beliefs of those who were not implementing the Spady model. This data could have provided stronger support for the research question, ‘Do teachers who are practicing the

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Spady model share common values?’ (p. 86), by possibly showing the incongruent belief profiles held by the non-implementers.

Summary

This literature review has sought to highlight recent and relevant studies in the areas of epistemological, ontological and axiological beliefs as they relate to the implementation of new curriculum policy. It has delineated the research that supports the EOCD model which appears to relate ontology and epistemology and provide empirical data to support the construct validity and reliability of the theoretical model. It has reviewed an ontological study that supports the above model by demonstrating the existence of ontological categories and examined an axiological study that appears to demonstrate that there is congruency in the axiological beliefs of curriculum policy and those who are required to enact the policy at the level of the classroom. The information obtained from the articles reviewed seem to support the directions taken in the current study and will provide a research base upon which results will be analysed and conclusions drawn in due course.

Chapter 3 - Methodology

The purpose of this research is to explore the beliefs inherent in the CAC curriculum document through document analysis and infer the beliefs held by one teacher currently ‘successfully’ implementing the CAC in a standard four classroom. The first section describes the study design and seeks to justify its use. The philosophical framework that undergirds the type of data being collected and the method of analysis of such data is then discussed. This is followed by a description of the sampling method and the procedure with specific reference to data collection and analysis, instruments used along with a description of reliability and validity issues with respect to these instruments.

Design of Study

The study uses a qualitative, single case, within site approach ‘in which the researcher [intends to] explore a real-life contemporary bounded system (a case) ... through detailed in-depth data collection involving multiple sources of information (eg. observations, interviews, audio-visual material and documents) and reports a case description and case themes’ (Cresswell pg. 97). The case study approach, defined by its collection of rich, thick data of an object under study bounded in time and space is seen as most suitable as it allows for, in the researcher’s opinion, the exploration of the best possible sources of data, methods of collection (of data) and data analysis most suitable for the interpretive nature of the concept being investigated; beliefs. The concept of beliefs, being itself intrinsic and covert in nature and very often context bound (Chai, Hong and Teo, 2009 cited in Kapanadze and Markic, 2013; pg.145), requires a design that seeks to unearth detailed data from multiple sources which would be interpreted to bring to light the underlying beliefs under stipulated boundaries of time and space. Pajares, (1992), advises

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that ‘if reasonable inferences about beliefs [are required] then teachers’ verbal expressions, predispositions to action, and teaching behaviours must all be included so, in addition to traditional belief inventories and self-report instruments, open-ended interviews, responses to dilemmas and vignettes and observation of behaviour must be included’(p. 327). Furthermore researchers have identified situations where the enacted beliefs are quite apart from those revealed through other forms of data collection such as surveys or questionnaires which are used far more often in quantitative approaches (Schutz, 1970, Rokeach, 1968 cited in Pajares, 1992 ; p. 319; Verma and Peters, 1975, Hatch and Freeman, 1988 as cited in Smith, 1993). According to Yin (2009), ‘the single-case study is an appropriate design under several circumstances, and five single-case rationales- that is having a *critical, unusual, common, revelatory, or longitudinal case*’ (pg. 51) will give credence to the design chosen. This case can be considered *common* in terms of Yin’s reasoning as it applies to the Trinidad and Tobago context where the research is aimed at capturing ‘circumstances and conditions of an everyday situation [in local primary schools] –again because of the lessons it might provide about the social processes related to some theoretical interest’ (Yin, 2009 pg. 52). The social process involved relates to the teachers’ beliefs and their impact on the interpretation and implementation of the CAC curriculum innovation. The issue of beliefs and its impact on curriculum is of tremendous theoretical importance in the study of curriculum theory and is the object of much research (Rokeach, 1968; Feather, 1975; Nespor, 1987; Pajares, 1992; Schommer, 1994; Rogers, 2003; Fullan, 2007; Savasci-Acikalin, 2009). Creswell, (2006), postulates that there are levels of sampling that should be identified in a good plan. ‘Researchers can sample at the site level, the event or process level and the participant level’ (Creswell, pg.126). At the site level, convenience sampling was used because of the cost and time factors that would impinge negatively on the

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researcher. Therefore, a research site in the immediate educational district in which the researcher works was selected so that ready and quick access would be possible. However, at both the process and participant level, criterion sampling, which according to Miles and Huberman, 1994, (as cited in Creswell 2006, pg. 127) is a sampling method ‘that meets some criterion; useful for quality assurance’. A standard-four class was purposely chosen since it is at this level all of the CAC curriculum changes are taking place and therefore relevant data would be readily accessible. The criterion used to select the teacher was that of being evaluated as successfully implementing the curriculum innovations associated with the CAC. The teacher was evaluated as successful based on the verbal reports given to the Principal by a Ministry of Education appointed C.A.C. Monitor who is charged with the responsibility of overseeing the proper implementation of all aspects of C.A.C. and reporting all findings to principals and Ministry of Education officials.

Data Analysis

The data collected will be interpreted by the researcher through discourse analysis (written and spoken). The methodological approach to data collection and analysis is theoretically informed by symbolic interactionism in which it is posited that ‘humans act towards objects based on the meanings they have for them; meaning derives from social interaction; and, social interaction requires language, thus , meanings are revealed in symbol systems’ (Blumer, 1969 cited in Wallace and Priestley, 2011). Thus the structure, language used, proposed teaching/learning materials, pedagogical and assessment strategies as delineated in the CAC Curriculum Guides published by the Ministry of Education will be analyzed for particular themes relevant to the research questions. In the case of epistemology and ontology, the relative strengths of simple and certain knowledge, justification by authority, personal justification and

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justification by other means would be evaluated based on their relative presence in the curriculum documents which includes the CAC Teachers' Instruction Guide and the CAC Teachers Manual for Science . The axiological beliefs inherent in the CAC will be analysed using Huebner's, (1975), framework described in chapter one. The Epistemological and Ontological Cognition Questionnaire (EOCQ) (Greene et al., 2010) (see appendix 1) and a semi-structured interview (see appendix 2) would be used to collect data from participants. The discourse analysis will be based on a methodology proposed by Lemke, (1990), which is inextricably linked theoretically to social semiotics, the synthesis of several modern approaches to the study of social meaning and social action (Lemke, 1990, p. 183). Lemke asserts that the semantic relationships or connections among a series of words or concepts (called thematic terms) in a particular field of study are termed their thematic patterns. These thematic patterns are representative of the way the particular area of the field of study is described semantically in terms of language. Thematic diagrams can thus be constructed to show the semantic relationships among the actions and assertions of participants (and/or documents) in this research and the beliefs (epistemological, ontological and axiological) that they represent. The semantic relationships among the thematic terms is expressed by standard abbreviations for the semantic role of the first term followed by a slash (/) and the (semantic role) of the second thematic term. Lemke, (1990), further states that 'comparing [thematic patterns] with the syllabus can tell us how closely what happens in the classroom corresponds to what the "official" curriculum prescribes' (p.94). The researcher is here very mindful not to interpret based on his subjective beliefs and experiences but rather, as far as is humanly possible, on the data collected from the various sources. Classroom observations and interviews done will be also analyzed in a similar vein and evidence will be recorded in the matrix shown in figure one below. A matrix

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(figure one) will be done for each data source and cross reference analysis will serve to assist in the determination of whether the values inherent in the CAC curriculum document is similar to those held by the ‘successful’ teacher.

Date : _____ Data Source : _____

Type of Belief : Ontological / Epistemological

Dimensions	Relative Strength - strong/moderate/weak
Simple and Certain Knowledge	
Justification by Authority	
Personal Justification	
Other Means of Justification	

Date : _____ Data Source : _____

Type of Belief : Axiological

Dimensions	Relative strength – strong / moderate /weak
Technical	
Political	
Scientific	
Aesthetic	
Ethical	

Figure 2. Relative Prevalence of Belief Dimensions. To be used to quantify relative presence of beliefs from analysis of data.

Procedure

The procedure to be used in this investigation will first involve seeking the permission of the Ministry of Education and school principal to conduct research in the school followed by a letter to the participant (see appendix 5) seeking his participation and giving him the undertaking of confidentiality and ethical practice on the part of the researcher. An examination of classroom reports compiled by an external monitor employed by the Ministry of Education to oversee the implementation of the CAC curriculum will then be undertaken. These reports are done by the monitor following every visit with the classroom teacher and presented to the principal for noting and follow-up action where necessary. The reports will be used to determine to what extent the classroom teacher can be described as successfully implementing the curriculum.

Data collection. The participant will be first asked to complete the EOCQ (see appendix 1) as the responses from this document will serve as the basis of planning the shorter case interview (Yin, 2009, p.111) to collect rich thick data on the participant's epistemological and ontological beliefs and to further clarify the extent to which he subscribes to the dimensions outlined in the EOCD model. Yin, (2009), explains that this type of interview can be used to corroborate findings that may have already been established however the questions must be carefully worded to allow the interviewee another opportunity to speak on the topic as if doing so for the first time during the research (see appendix 2). Leading questions are completely avoided and the researcher must proceed as if this data is being discovered for the first time (p. 111). This will be followed, although not immediately, by a prolonged case study interview (Yin, 2009, p.110) aimed at delineating the axiological beliefs of the participant using open-ended questions that seek to bring out insights, opinions and interpretations of classroom experience and to utilize the data therein to infer the axiological beliefs of the participant (see appendix three). The long

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interview protocol employed is based on research done by Ladd, (1995), in which she sought to uncover the axiological beliefs of teachers implementing a new curriculum programme at that time. These interviews will be transcribed in total and analyzed using Lemke's, (1990), discourse analysis technique, however, the researcher is mindful that, 'transcription at the level of the word also erases information about emphasis, value-orientation, degree of certainty or doubt, attitude of surprise or expectability, irony, humour, emotional force, speaker identity, and speaker dialect or language background' (Lemke, 2012, p.1444). Nevertheless, the overall approach to the analysis of data from both interviews will involve the following as adapted from Ladd, (1995); a preliminary reading of the transcribed interviews to get an overview of the entire text followed by a second reading to highlight and colour code instances of the five value types or type of justification as the case may be. Lemke, (2012), explains that a researcher's ability to extract the beliefs inherent in the text 'is possible only to the extent that the text repeats the same basic semantic patterns, makes the same basic kinds of connections among the same basic processes and entities again and again' (p.1447). Lemke's thematic diagrams will be created from colour coded text to justify its selection and further indicate the type of semantic relationships between the various constructs and the participant's discourse. The instances of highlighted values or epistemological and ontological beliefs will be charted using the tables shown in figure one as evidence of the prevalence of one belief over another and this information will then be used to construct a belief profile of the participant and the documents examined.

The EOCQ which is one of the instruments being used to collect quantitative data on the epistemological and ontological beliefs of the participant was developed, piloted and tested by Greene et al., (2008, 2010). The EOCQ is based on the Epistemic and Ontological Cognition Development Model (EOCD), developed by Greene et. al., (2008), and it represents an

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‘integration of numerous developmental and system of beliefs personal epistemology models’ (Greene et al., 2008, p.152). Greene et al., (2010), tested their model by the use of confirmatory factor analyses (CFAs) (Muis et al., 2006, Kline, 2005, as cited in Greene et al., 2010, p. 236) for evaluating the construct validity of scores, that is the hypothesized relations among the questions used in the instrument and the dimensions such as simple and certain knowledge or justification by authority that they were designed to capture. Factor mixture modeling (Gagne, 2006; Lubke & Muthen, 2005, as cited in Greene et al., 2010), was used to statistically test the hypothesized relations between the positions in the model i.e. realist, dogmatist, skepticist and rationalist and the individuals’ patterns of scores attained in the latent factor measurement. Hence factor mixture modeling can affirm the hypothesized position of realists as a group that will score relatively on simple and certain knowledge, justification by authority and personal justification or otherwise and possibly, at the same time, show that the model needs revision if a profile of means was found that was not hypothesized (Greene et al. 2010, p.239). In spite of their proposals to test both validity and reliability of the EOCD model and the EOCQ, Greene et al. (2010), delineates the limitations of this model. They admit that their claim that skeptics are unlikely to accept knowledge claims warranted by experts require additional support, that the possibility of persons’ inability to accurately report their beliefs is real and they concur with Muis et al. (2006), ‘that the most advanced kinds of epistemic cognition may be difficult to characterize on Likert –type response scales with dualistic and multiplistic positions as their endpoints’ (p.239).

The statistical analyses referred to above showed that the reliability and validity of all latent factors except simple and certain knowledge were acceptable. The construct reliability of the dimensional scores using Coefficient *H* revealed that three were well over 0.7, two were just

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below, and one, personal justification in an ill-structured domain, was well below seven. The confirmatory factor analyses produced a standardized root mean square residual (SRMR) of .08 and a robust root mean square estimate of approximation (RMSEA) of .06, 'meeting the criteria for acceptable model-data fit recommended by Hu and Bentler, (1999)' (cited in Greene et al. 2010, p.242). The items for mathematics simple and certain knowledge showed low standardized factor loadings which 'pointed to the need for further bootstrapping (King and Kithcener, 2004, p. 11) between item validation, item design and the EOCD model' (Greene et al, 2010, p.242). As far as the factor mixture modeling is concerned, patterns of latent class factor means which can also be referred to as profiles derived from the data were compared with the profiles posited in the EOCD. Eight of the twelve profiles found matched those posited in the EOCD and can therefore be considered evidence of the validity of the conceptual model (Greene et al. 2010, p. 245). The four profiles not posited were not supportive of the EOCD and indicate further bootstrapping between model revision and item design is needed. Greene et al., (2010), chose to model participants' scores across the three dimensions (simple and certain knowledge etc.) instead of examining scores on each dimension independently and it was found that this approach produced a better fit to the data than the independent approach. According to Greene et al.,(2010), 'looking at both the reliability and validity of factor scores across classes, the mathematics and history simple and certain knowledge factors were most problematic' (p. 245) possibly indicating that ontological cognition needs to be further examined. The evidence also supported the EOCD model's separation of well-structured and ill-structured domains however, Greene et al., (2010), question whether domain differences 'exist only between well-structured and ill-structured domains and not at a more specific level' (p. 248).

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Axiological beliefs are being measured through the use of a prolonged case study interview (Yin, 2005), in which participants are asked about their 'interpretations and opinions about people and events or their insights, explanations and meanings related to certain occurrences' (p. 111). The interview protocol (see appendix 3) was designed by Ladd, (1995) to assess the axiological beliefs in terms of Huebner, (1975), framework of teacher participants implementing the Spady's Model of Outcome –Based Education. It was adapted to include collection of demographic data and to reflect the Continuous Assessment Component of the Secondary Entrance Assessment (CAC) which is the change of curriculum policy that is being currently investigated. Ladd, (1995) developed a list of words (see appendix 3) that were considered to be semantically related to the five dimensions of Huebner's framework and which could be used to guide the analysis of the transcribed interview as well as the curriculum documents. This researcher proposes to use Lemke's thematic analysis in conjunction with Ladd's, (1995), list of terms (appendix 4) to identify instances of the different types of valuing as they are unearthed in the CAC curriculum documents. The relative presence of the value types would be used to find the dominant axiological value (s) inherent in the curriculum document as well as those held by the teacher.

Chapter 4 - Data Analysis and Presentation of Findings

This chapter seeks to present the data relevant to each research question. It seeks to first present the epistemological, ontological and axiological beliefs uncovered by the researcher in the C.A.C. Teachers' Manual and the Teachers' Instruction Guides, 2014/2015 firstly for science, a well-structured domain followed by drama, an ill-structured domain using Lemke's, (1990), approach to discourse analysis as detailed in the methodology chapter. However, in the case of drama, the Assessment Guide was used instead of a Teachers' Instruction Guide. This will be followed by the presentation and of the data coming out of the questionnaire and interviews with the research participant, which were intended to uncover the above types of beliefs that are inherent in his approach to the implementation of the science and drama components of the C.A.C.

Epistemological and Ontological Beliefs in the CAC Science Curriculum

The C.A.C teachers' manual for science. The C.A.C. Teachers' Manual was produced by the curriculum developers, that is, the Curriculum Division of the Ministry of Education, as reference material to be used along with the knowledge gathered by teachers from official training. It gives a philosophical overview of the pedagogical approach used in CAC science, general and specific objectives, assessment guidelines, sample activities and examples of expected responses from pupils. It should also be noted that this document was designed to be used with learners in the 10 through 14 year age group who are enrolled in the primary system so that the epistemological and ontological beliefs that are inherent in the curriculum document of a well-structured domain such as science may be those that the developers believe to be age appropriate for primary school students.

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there is one external reality waiting to be perceived as against constructing of one's own (and hence multiple possible realities). At the same time, the analysis seems to suggest that there are multiple ways of coming to understand this reality (knowledge) and hence multiple ways of justification of what can be termed knowledge or reality, based on the use of the clause 'one way of seeing...reality'. The question that now comes to the fore is: what are these multiple ways of justification that are integral in the methods proposed in the curriculum document? But before this concern can be investigated, it must be noted that this document was produced for children of primary school age and it is reasonably possible that the developers would have given priority to one or more types of justification over others based on the primary school context.

The Token/Type semantic relationship between the enquiry-based approach and the students taking an active role in the learning process and the Process/Target relationship between the latter and students' construction of their own conceptual understanding of science concepts seem to imply that personal justification is the preferred means of knowledge construction. However, also implied by the use of the term 'science concepts' in the target clause is the belief that these concepts are pre-existing and students are simply being led to discover them using the constructivist (of which enquiry-based is one type) approach.

Figure 4 below shows the semantic relationships found in the second paragraph of the introduction. The Medium/Process and Process/Target semantic relationships found between the scientific approach and the goals of learning science seem to further exemplify the simple and certain view of knowledge as the overarching ontological stance thus far. The stated goal of acquiring scientific facts, set procedures, problem-solving skills, personal qualities and attitudes implies that these are believed to be pre-existing and are necessary facets of scientific capability. This conclusion is further supported by authoritative presentations at the end of the teachers'

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manual which guide students through existing procedures to make varying types of effective measurements. The use of process/target semantic relationships in the ‘How to’ demonstrations and practice exercises reinforces the simple and certain ontological stance. According to the analysis of the introductory text, learning science is believed to be a process in which students acquire or learn scientific facts, certain cognitive and manipulative skills and personal attributes that will enable them to effectively cope with novel scientific situations in which justification of what is considered truth can be done in ways that possibly include reliance on authority but will certainly involve other means of justification, the most important of which seems to be personal justification.

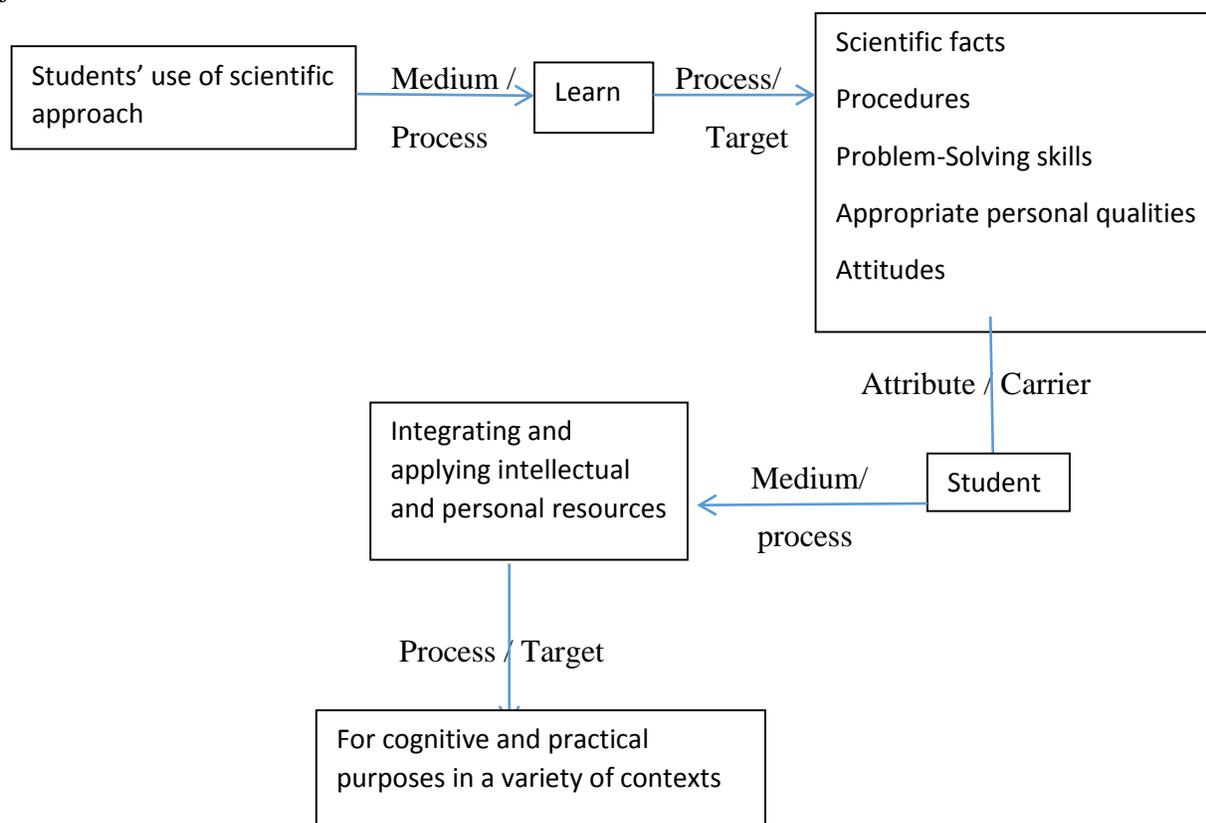


Figure 4. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Paragraph 2 of Introduction -Teachers' Manual for Science.

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Figure 5 below illustrates the thematic patterns found through analysis of the general statement on assessment strategies to be used in the CAC curriculum reform. It seems to indicate a superordinate/subordinate semantic relationship between assessment strategies and the process of scientific enquiry which means that scientific enquiry is not only a process through which students learn science but is also a means of assessment of scientific capability. In other words, the emphasis of assessment in CAC science is on the process.

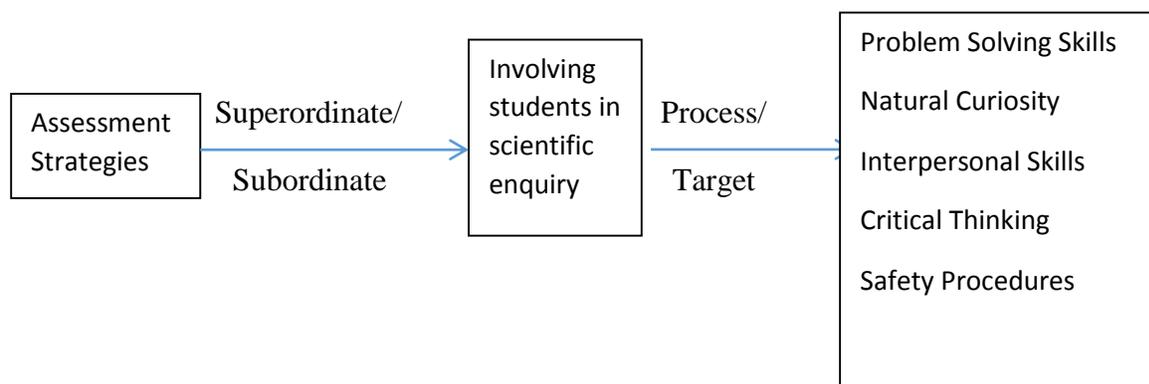


Figure 5. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Paragraph 3 of Introduction, 'Assessment Strategies' -Teachers' Manual for Science.

The assessment strategies appear to target the development of cognitive and manipulative skills relevant to science as opposed to knowledge-based assessment tasks. This approach to assessment and the target or object of the assessment process, which are knowledge, skills and behaviours required to enable pupils to engage in various means of justification, suggest a more complex ontological stance than the simple and certain view of reality, as the students' abilities to construct their own understandings are being assessed. The strong presence of the simple and certain ontological stance along with the strong reliance on personal and authoritative

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justification in this document suggest a realist position in terms of the Greene et al., (2010) theoretical model, the model that stands as the theoretical framework of this study.

The CAC teachers' instruction guide – science 2014/2015. The students' learning activities and the concurrent assessment strategies are further delineated in the Teachers' Instruction Guide. This document gives a detailed account of what is to be done by both teacher and pupil to achieve stated specific objectives and the details of the assessment process. Rather than design and execute the scientific enquiry process, the process was pre-designed with methods, data collection instruments and questions to guide conclusions and students were taught through drill and practice how to effect accurate measurements using the prescribed tools. Figure 6 below shows examples of thematic relationships in the scoring rubric for CAC science.

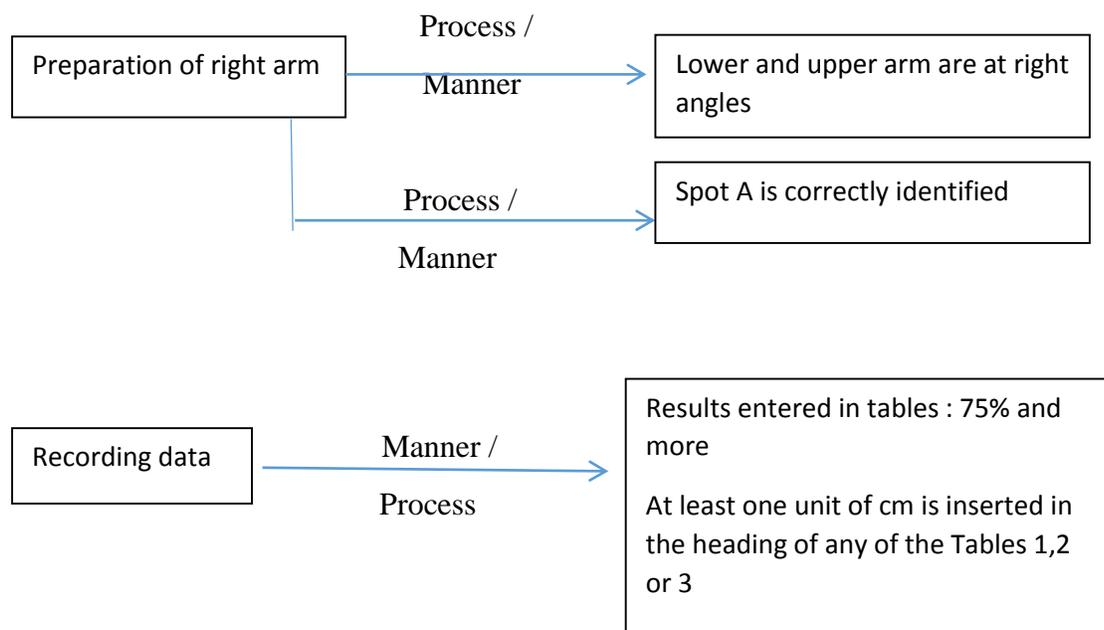


Figure 6. Thematic Analysis using Lemke's, (1990) method. Shows analysis of typical part of Scoring Rubric from Teachers' Instruction Guide-Science

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The manner/process semantic relationships found between the skills inherent in the activity and the stated expectations underscores the simple and certain view of knowledge as the main ontological stance taken by the curriculum developers with justification by authoritative means making a strong showing since students must utilize the skills and procedures detailed in their activity booklets and/or taught by the teacher previously.

The activities assigned for completion by the students are also detailed in the Teachers' Instruction Guide and is related to the science strand 'Living Things' which is prescribed in the national science curriculum. In the background information provided in this section of the guide, the following information, analysed in terms of Lemke, (1990), methodology, is shown in figure 7 below together with an analysis of the specific objectives of the prescribed activities.

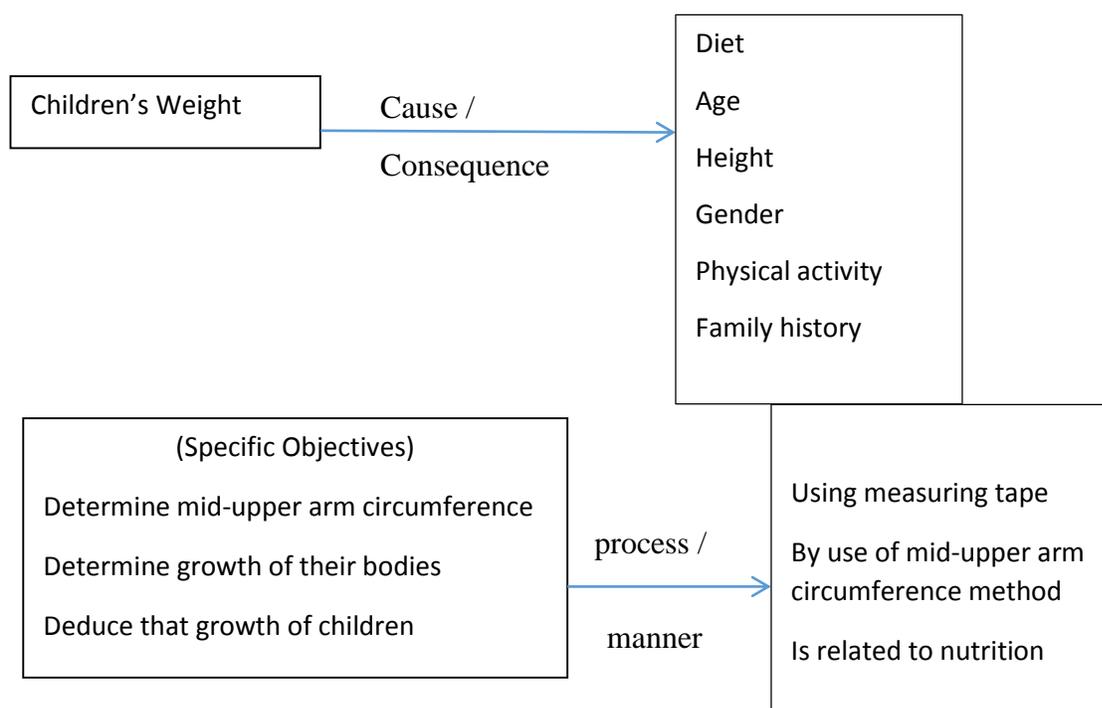


Figure 7. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Background Information and Specific Objectives for Students' Activities-Teachers' Instruction Guide

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The cause / consequence semantic relationship between the phrase children's weight and the factors indicated above is yet another instance of justification by authority and a simple and certain view of knowledge or reality since this information was given as pre-existing facts. The process / manner semantic relationships between the clauses in the specific objectives again illustrate that the skills involved in using the tape measure and the 'upper-arm circumference method' were pre-existing and represented knowledge transferred by authoritative persons (teachers) to the pupils. Thus, using the matrix given in figure 1 of chapter 3, summarized below is the relative strengths of the epistemological and ontological beliefs found in the C.A.C. documents analyzed using Lemke's, (1990), thematic analysis approach.

Date : 31st May, 2015 Data Source : CAC Teachers Manual-Science and Teachers' Instruction Guide-Science

Type of Belief : Ontological / Epistemological

Dimensions	Relative Strength - strong/moderate/weak
Simple and Certain Knowledge	Strong
Justification by Authority	Strong
Personal Justification	Strong
Other Means of Justification	Weak

Figure 8. Ontological / Epistemological Data Table. Shows relative presence of epistemological and ontological beliefs in CAC Science curriculum documents.

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The data presented in the table in figure 8 clearly points to the realist position assumed in the CAC science curriculum thus far based on the Model of Epistemic and Ontological Cognition proposed by Greene et al.,(2010) with strong belief in personal and authoritative justification and a simple and certain view of reality ,truth or what is considered, knowledge.

Axiological Values in CAC Science Curriculum

The teachers' instruction guide. An analysis of Teachers' Instruction Guide for the 2014 / 2015 CAC Science Project revealed the following thematic relationships as shown in figure 9 below.

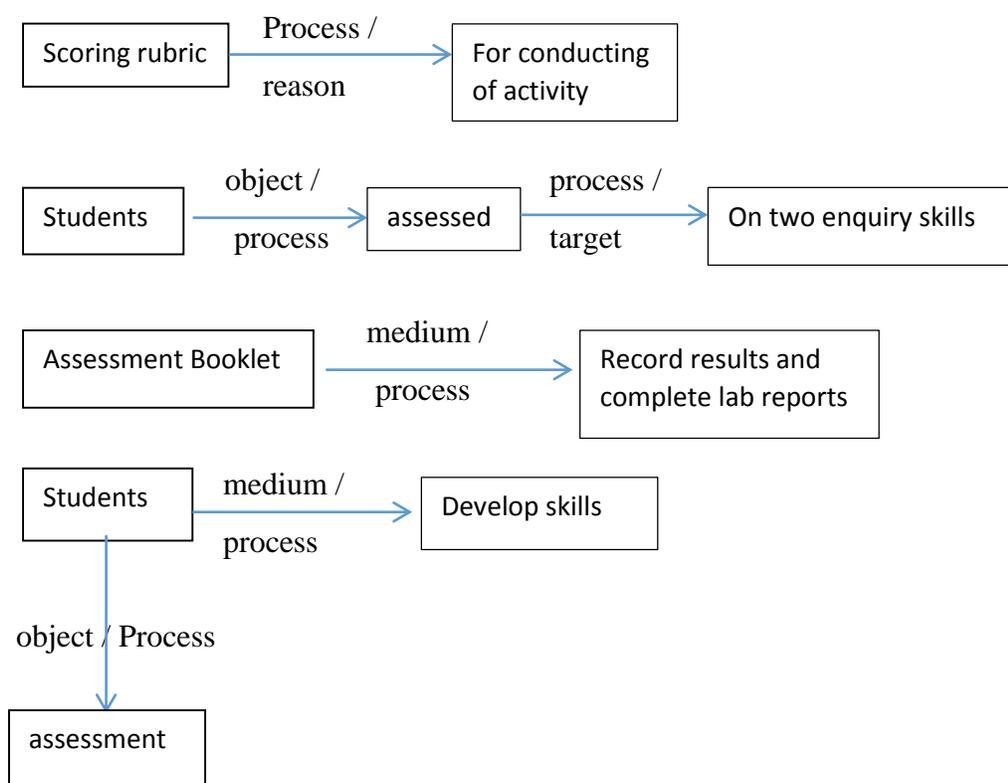


Figure 9. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Introduction of Teachers' Instruction Guide-Science

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The semantic relationships shown between the clauses and phrases above reveal the presence of technological valuing where the emphasis lies on the achievement of set goals and objectives, the measuring of this achievement and efficiency of the process. According to Ladd, (1995), 'a sociological analysis is used to envision the ends or outcomes of education and then objectives are translated into the psychological language of behavioural concepts, skills, or attitudes' (p.32). The achievement of these set goals become the main priority of curriculum planners with technological values with emphasis placed on the efficient transfer of information or learning to pupils who are eventually assessed and graded as a measure of the efficiency of the process.

Instances of political valuing were also uncovered under a section entitled 'Note to Teacher'. Figure 10 below illustrates the semantic relationships that clearly show the power and control that the educator has over the student. The agent/process and object / process semantic relationships and the use of modal verbs of varying degrees of obligation convey the inherent power relations.

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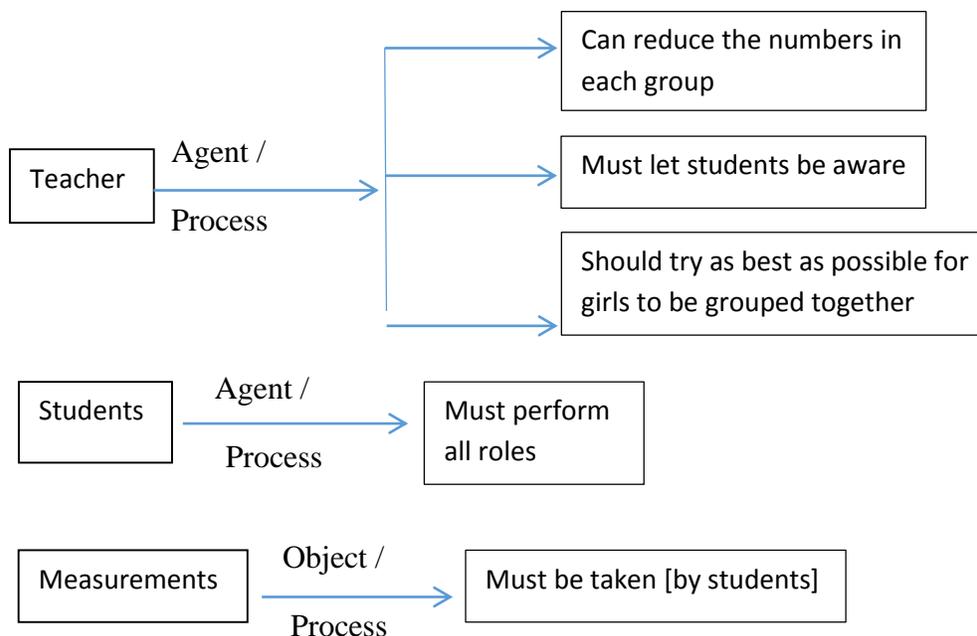


Figure 10. Thematic Analysis using Lemke's, (1990) method. Shows analysis of 'Note to Teacher' in Teachers' Instruction Guide- Science

The remaining section of the Teachers' Instruction Guide comprises a detailed description of the activities students are required to complete for the purposes of assessment. Similar to the Teachers Manual, which is analysed in the next section, this remaining part of the guide details objectives, teaching and learning activities and assessment instruments and rubrics that clearly point to technological valuing. However, political valuing is also moderately present in the beliefs that seem to influence the form that the curriculum takes. The Top-Down approach used in the development and dissemination of this curriculum in which the materials provided, the required activities (rather than suggested), the data collected and the assessment instruments were handed down by the curriculum developers to the teachers and the teachers to the students with little or no consideration given their particular needs and contexts. Much of the furor over CAC may have been symptoms of this approach and is an area of possible further research.

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Appendix 6 is a thematic analysis of a section entitled 'Teacher's Role' on page three of the guide. The agent/process and process/target semantic relationships that describe the teachers thematic relationships with the students as target and processes such as 'monitor', 'ensure' and 'check' clearly delineates the political nature and technological values that subsumes the curriculum approach.

The instruction guide therefore has revealed a strong presence of technological and political valuing with no evidence of scientific, aesthetic or ethical valuing found. The instruction guide is a better indicator of what actually transpires in the classroom and therefore leaves the researcher to question whether the scientific valuing moderately espoused in the Teachers' Manual was empty rhetoric. The strong presence of technological and political valuing indicate a strong simple and certain ontological view of reality which is the main tenet of realist philosophy.

The CAC science teachers' manual. Appendix 7 is a thematic analysis of the introduction of the CAC Science Teachers' Manual. Science is seen as a creative human activity brought on by a desire to explore and understand the world making it an aesthetic educational activity in terms of Huebner's, (1975), axiological values framework in which 'the activity is valued for its truth and revealed meanings' (Ladd,1995, p.34). Another example of aesthetic valuing is the goal / process semantic relationship between the enquiry approach used in the curriculum and the goals of developing or experiencing problem-solving and personal skills along with the attitudes of scientists suggests that students are being afforded the opportunities to

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experience that which is felt and enjoyed by scientists making the science activities ‘symbolic of that felt and lived by [scientists]’ (Ladd,1995, p. 34).

There are also two instances of scientific valuing in the thematic diagram shown in appendix 7. The medium / process semantic relationship between problem solving skills, appropriate personal skills and attitudes on one hand and finding out about the world and information on how things work on the other is one such example. It is these skills and attitudes that give the student the wherewithal to produce new knowledge, which indeed is the very essence of scientific valuing. According to Ladd, (1995), ‘scientific values promote activity which produces new knowledge’ (p. 33) so that the token / type semantic relationship between science and creative human activity and one way of seeing, exploring and understanding reality suggests that science itself is endowed with scientific values as it seeks to produce new understandings through scientific enquiry.

A thematic analysis of the assessment strategies outlined in the Teachers’ Manual is shown in appendix 8. The structure of the assessment strategies in which activities are selected for the purpose of achieving the goals identified in the process / goals and token / type semantic relationships are evidence of technological valuing as activities outlined in the manual are geared towards the achievement of these goals in the most efficient manner possible. There is one instance of ethical valuing found in the semantic relationship between the clauses ‘demonstrate good interpersonal skills’ and ‘working cooperatively with others, respecting others and building team spirit’. As Huebner, (1966), cited in Ladd, (1995), explains, ‘the educational activity is life-and life’s meanings are witnessed and lived in the classroom’ (p.34). Four instances of scientific valuing were found in which the following cognitive and manipulative skills which are requisite in the production of new understandings were identified: develop problem solving

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skills, conducting meaningful enquiries into real life issues, creative and innovative critical thinking and develop an awareness of the consequences of safety.

The students' learning activities detailed in the manual are overwhelmingly symbolic of technical valuing as specific objectives, materials needed and clearly stated, sequential procedures are given to maximize efficiency of the learning process. Pupils are required to record their findings in a given template that serves as a report on the activity done and conclusions drawn. The teacher is provided with a detailed rubric with expected performance indicators and assigned marks to be used as a grading system.

Date : 30th May, 2015 Data Source : CAC Teachers' Manual and Teachers' Instruction Guide

Type of Belief : Axiological

Dimensions	Relative strength – strong / moderate /weak
Technical	Strong
Political	Moderate
Scientific	Moderate
Aesthetic	Weak
Ethical	Weak

Figure 11. Relative Prevalence of Axiological Belief Dimensions Found in CAC Science Curriculum Documents.

Epistemological and Ontological Beliefs in the CAC Drama Curriculum

The C.A.C teachers' manual for drama and the assessment guide. The C.A.C. Teachers' Manual for Drama comprises an introduction, a section detailing general and specific objectives and a programme of work which is divided into three terms' work. For Term One a detailed description of the activities to be done with suggested formative evaluation and a final assessment complete with rubric and a score sheet is given. The topic to be done is mime. Term two and three comprises a number of weekly activities all aimed at developing storytelling abilities and though the same format of formative assessment as used for mime is suggested for use in these two terms, there is no summative assessment although there is a suggestion that storytelling activities may be scheduled for enrichment and enjoyment purposes only (p.6).

A thematic analysis was carried out using Lemke's, (1990), methodology on the CAC Teachers' Manual for Drama. The analysis began with the section entitled 'Introduction' (see appendix 9) and revealed that the multiple process / target or medium / target semantic relationships demonstrated that the process of dramatic activity was aimed, not at teaching facts or accessing a knowable reality, but rather at developing cognitive skills that can be used to negotiate one's own perception of reality and create attitudes and values that would motivate students to pursue learning opportunities with confidence. The data indicated that the aim (target) of the learning process was the development of concentration, collaboration, creative thinking, critical thinking and problem solving while providing fun opportunities for students to express thoughts, ideas and feelings suggesting a strong underlying complex ontology and strong personal and other means of justification in terms of Greene et al., (2010), model. Only once was the target of the medium, dramatic play, identified as learning of facts but no further elucidation on what facts exactly were to be taught was mentioned in the manual. The data further indicated

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that the role of teachers as agents in the semantic relationships were to plan, organize and initiate activities targeted at developing the cognitive skills and ensuring that positive experiences in terms of enjoyment, respect for students' opinions and catering to multiple learning abilities are integral in the learning process. According to Greene et al., (2010), 'every academic domain has a compendium of knowledge...[which] is composed of a number of classifications' (p.237) and a simple view of knowledge means a limited number of these classifications. The wide-ranging learning outcomes mentioned seem to suggest that the ontological categories being developed and used by students exposed to the drama curriculum are more than just limited and may point to a complex ontological stance where knowledge will be constructed by students using the many cognitive skills being taught. The medium/process semantic relationship between the students and goals of the drama curriculum indicate that the student is the medium through which dramatic activities will be used to develop the student's ability to express thoughts, ideas and feelings, build self-esteem and have fun while learning. These types of curriculum goals are indicative of a non-realist ontological and epistemological stance but this conclusion must be justified by analyzing the more specific objectives of the curriculum, the teaching /learning strategies and the assessment strategies. This conclusion of a non-realist ontological stance taken in the drama curriculum document is also supported by the roles assigned to the teacher. The document states that teachers interact on several levels with students including less formal arrangements, student-centred approaches and strategies that encourage improvisational skills which result in many positive effects but notably this caters for multiple intelligences, allows students to think on their feet and allows for teaching in the moment. Also noted was the role of the teacher to prepare the physical environment and plan activities which were seen to have a cause/consequence semantic relationship with students extending their imagination, exercising

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their innate creative abilities, experiencing fulfillment and having fun. These roles detailed for the teacher and the ideological stance of the teaching/learning strategies where constructivism appears to be the preferred mode together with the complex ontological stance seen thus far support the non-realist ontological/epistemological perspective. Thus far there is little evidence to indicate a simple and certain view of knowledge where there is an obvious aim to teach facts or impart drama-based knowledge to the students.

The next section of the Teachers' Manual for drama detailed the general and specific objectives of the programme and its thematic analysis is shown in appendix 10. The analysis of the general objectives reveals the curriculum's intention to develop pupils' creative and aesthetic abilities, and use decision-making and problem solving activities to instill leadership abilities in students. Notably absent are mention of drama related facts, basic skills and understandings that suggest an external repertoire of necessary knowledge pertinent to the study of drama.

The specific objectives are the next objects of analysis. These objectives seem to be almost as generalized as the general objectives previously reviewed although they do further clarify the general intent of the curriculum. The agent/process/target relationships identified again seem to indicate a very weak realist perspective since the processes identified save and except develop and understand, do not indicate the acquisition of any pre-existing knowledge or understandings on the part of the students rather the stated processes such as explore, engage in, discuss, reflect, create and work in and participate in appear to require students to create their own understandings whether through their own volition or through socially constructed means as they reflect and discuss. There is indeed a weak presence of the simple and certain ontological stance with reliance on authoritative justification as students are required to operate in space while respecting personal space, understand the importance of fitness and develop an awareness

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of, and recognition of sound, social skills and the use of voice, mind and body and space to create scenarios. These objectives seem to presume the existence of general and personal space, certain necessary sounds and some kind of knowledge of what fitness means and particular ideas about using mind, body and space to create scenarios. Thus far there appears to be a very weak presence of the simple and certain ontological stance and authoritative justification has been indicated for a few specific objectives. This could possibly point to dogmatism as proposed in the Greene et al., (2010), theoretical model which informs this study.

The questions suggested for reflection are next analysed and the agent / process /target semantic relationships indicated that there were a number of instances requiring factual recall or yes/no responses that involved little critical thinking yet there were two questions where the process required analytical thinking in order to respond. Both higher order questions seem to subscribe to the belief that knowledge is constructed in the mind of the individual since the pupils were asked to compare and contrast dramatic activity with stage performances and give their views on what they thought the activity was about. These activities are realist in nature as a simple and certain view of reality is presumed and personal justification of what might be considered truth is indicated.

The outline of the programme of work analyzed above is followed by a detailed programme for three terms with each term's work being sub-divided into once-a-week activities. The section begins with an introduction to mime which gives some insight into the nature of pantomimic activities and the teaching method of side-coaching which is prescribed for use by the teacher. The thematic analysis of the introduction to mime is shown in appendix 12. The simple and certain view of knowledge and authoritative justification seem to be taking precedence as the actual classroom strategies draw nearer towards description. The medium of

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simple dramatic activities that will be introduced to students with emphasis being placed on skills in mime suggests that there are pre-existing ideas about what skills are basic to mime and are to be taught using a methodology termed side-coaching. The role of the teacher appears to be offering suggestions and commenting on performance thus transferring some of his understandings and knowledge of drama to the students to reinforce or correct the actions of students as they participate in the assigned activities. Accompanying the introduction is a table that identifies the several areas of drama to be taught in term 1. These areas appear to be skills that have been identified as pre-requisites for the successful completion of the performance assessment and therefore serve as evidence of pre-existing knowledge that must be taught to pupils by teachers who in turn will decide when they have learnt the skills well enough. Both the introduction and the table are evidence of a strong realist position taken at this point in the CAC drama curriculum.

The next section of the Teachers' Drama Manual comprises of ten lessons with detailed activities all aimed at developing the pantomimic skills necessary for pupils to achieve success at the summative evaluation that will be reviewed in the analysis of the assessment guide. Each lesson utilized the same activity structure beginning with a warm-up followed by the introductory activity, a mime activity, a cool down and journal writing where the guide questions, previously reviewed, were used to assist the students to reflect on the activity. These activities adopt a realist ontological/epistemological stance as the teacher assumes agency semantic relationships with processes such as instructed, side-coached, told, suggest and shows just to name a few, with students assuming a target position in the thematic analysis. Appendix 13 shows a sample of the thematic analysis of one such lesson. Each of the ten lessons was found to be underpinned by this same philosophical stance after thematic analysis. This is a marked

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deviation from the ontological and epistemological positions taken in the earlier sections of the curriculum document.

The Teachers' Manual for Drama has shown what seem to be inconsistencies between the philosophical positions taken in the introductions and preamble to the actual classroom activities and the actual activities prescribed for classroom use. These activities seem to be underpinned by a more realist ontological stance and knowledge claims exist externally and are dependent on justification by authority whereas the introduction points to justification of knowledge claims and understanding by means other than authority and a complex ontological stance where knowledge seem to be constructed by the individual himself or by social constructivism when students and teachers review or reflect on the prescribed activities.

An analysis of the CAC Drama Assessment Guide is attached as appendix 14. The assessment guide begins with an implementation plan and assessment framework which details the objectives to be assessed, the time frame and assessment method. The assessment methodology is made up of a mime-based performance appraisal and a journal aimed at assessing the developmental process involved in learning the drama skills. The students assume the agency position in the semantic relationships shown in the appended analysis and the processes that they undertook as their tasks included devising a story, creating objects, character and mood to portray a story, enhance style of story and reflect on the affective elements of the drama lessons. These semantic relationships point to a complex ontological stance in which pupils are constructing their own knowledge and understandings and expressing these through a pantomimic performance and a written journal. Yet justification of what is truth must come from authority represented by the teacher as illustrated in the actor/process semantic relationship between teacher and allocating marks. It is the teacher who must now evaluate their

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performances based on a rubric which details what is considered correct and true by those who possess authoritative knowledge of drama. This approach points to a dogmatist epistemological position where knowledge is justified by authority and there is a strong belief in the simple and certain view of reality.

The section entitled *Mime Skills and Development of Mime Story* is more or less a repeat of what has already been mentioned and analyzed in the drama manual so the next section of interest is a table entitled *Skills-Set for the Mime Story*. The analysis of the skills-set revealed that in addition to the generalized cognitive and affective skills aimed at in the drama curriculum as stated in the Teachers' Manual, there are a number of drama specific skills referred to as the 'Skills-Set for the Mime Story' given in tabular form in the document (p.2). The taxonomic relationships of process/location, hyponymy and meronymy among the clauses and phrases used to describe the topics of movement and gestures in the skills-set, demonstrate the assumption that the stated concepts such as levels, shapes, pace, stage areas and all the associated ideas are pre-existing and are necessary requirements for the successful pantomimic enactment of the situation given to students for their assessment. Furthermore, the manner/process and process/reason semantic relationships identified in the other parts of the skills-set, identify the necessary drama concepts such as stage positions, movement, positioning of people and objects and movement and stillness that must be part of the students' schema before they can develop character, establish setting and sequence story. These assumptions of pre-existing drama-specific concepts and skills stated in the table point to a simple and certain ontological stance in which knowledge lies external to the student and must be imparted or perceived and incorporated into their repertoire of dramatic abilities before the general and specific objectives mentioned earlier can be achieved. This belief also paves the way for epistemological justification by authoritative

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means personified by the classroom teacher as it is he who has to implement the prescribed developmental activities and positively or negatively reinforce students' actions that are evidence of the learning of these skills and concepts.

The thematic analysis of the rubrics for the performance task (mime story) reveals that the student assumes the agent position in a semantic relationship in which the processes such as conforms, aligns, shows, demonstrates and is able to create are all targeted at pre-set expectations that the teacher has of the student and which the student must demonstrate that he can live-up to. These targeted behaviours, such as conforming to the time requirement, clear sequencing, correct facial expressions, gestures and freezes, are all conceptualized in the mind of the teacher who is now an authority figure and the justifier of what is considered true knowledge or correct skills as the case may be. Thus at the level of the performance task and evaluation technique, it seems that a simple and certain view of knowledge is predominant and epistemological justification is authoritative thus pointing to a realist position in Green et al. (2013) model.

The section entitled 'The Drama Journal – Rationale' is analyzed next. The thematic analysis reveals a number of educational goals ascribed to the process of journaling in drama. These ends of the journaling process, which include self- reflection/evaluation, peer assessment, build critical thinking and problem solving and record, monitor and reflect on learning in drama, point to the construction of students' own knowledge through reflection on the dramatic activities prescribed by the curriculum. The rationale appears to be underpinned by complex ontological beliefs in which knowledge and understanding or reality is not an external entity but rather one which is personal and subjective. Justification of what is termed truth appears to be personal as the journal itself requires students to write their reflections on what they learnt,

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enjoyed, found challenging and what they liked doing most with their classmates and what they would like to learn more about. There is no pre-set answer scheme for the journal as students responses are accepted unconditionally as long as they reflect thoughts anchored around the dramatic activities. These observations are exemplary of the skepticist position in the Greene et al., (2010), model which is the theoretical base of this study.

In summary, the CAC drama curriculum appears to be mostly underpinned by ontological beliefs that views reality as simple and certain especially at the classroom level where activities are prescribed and aimed at developing certain key skills that are seen as necessary for drama education at the primary level. However, there is evidence in certain parts of the curriculum documents such as the introduction, general and specific objectives and the journal rationale of a more complex ontological stance where reality is seen as internally or socially constructed but this philosophical belief does not play itself out very much in the actual activities of the students except at the journal level and possibly during the reflection phase of every prescribed activity as detailed in the Teachers' Manual for Drama.

Figure 12 indicates the relative presence of the dimensions of ontological and epistemological cognition, as evaluated by the researcher, in the CAC Drama Curriculum documents previously referred to. Although there was a strong presence of personal and other means of justification in the Teachers' Manual which itself was a statement of intention, the analysis revealed that the actual activities and assessment procedures as outlined in the Assessment Guide, appeared to prioritize the taught skills outlined in the table of skills-set for drama.

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Date : 10th June, 2015 Data Source : The CAC Drama Teachers' Manual and The

Assessment Guide

Type of Belief : Ontological / Epistemological

Dimensions	Relative Strength - strong/moderate/weak
Simple and Certain Knowledge	Strong
Justification by Authority	Strong
Personal Justification	Moderate
Other Means of Justification	Moderate

Figure 12. Relative Prevalence of Epistemological and Ontological Belief Dimensions Found in

CAC Drama Curriculum Documents.

Axiological Values in the CAC Drama Curriculum

The C.A.C teachers' manual for drama and the assessment guide. The incidence of the five categories of axiological beliefs in terms of Huebner's, (1975), framework is indicated in red and by using a smaller font size (10 – Calibri) throughout appendices 10 to 14 which themselves are the thematic analyses of the drama curriculum documents mentioned above.

The introduction provides an overview of the teaching-learning approaches and expected outcomes of drama education in general and in the process gives some insight into the philosophical stance taken by the developers of the curriculum. The attribute/carrier semantic relationship between drama education and its attributes such as 'caters for development in all domains, alignment to more universal learning theories' along with agent /process semantic relationships between teachers and 'responsibility for preparing physical environment, planning activities to be taught' and 'to teach facts' are all indicative of technological valuing where emphasis is on efficiency, organized structures for teaching and learning and achievement of pre-determined ends.

However, in contrast to the axiological beliefs in the science curriculum, there are many instances of aesthetic and ethical valuing. The process / reason semantic relationships between dramatic play and clauses such as 'immerses students in different cultures and situations, stimulate empathy, encouraging teamwork, cooperation and respect and building self-esteem' indicate ethical valuing where the emphasis of 'the educational activity is [on] life and life's meaning [as] witnessed and lived in the classroom' (Huebner, 1966, as cited in Ladd, 1995, p. 34). Aesthetic valuing also has a marked presence in the introduction and indeed throughout the other parts of the curriculum documents. Ladd, (1995), explains that there are three dimensions

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of aesthetic valuing, physical distance, wholeness and design and symbolic meaning (p.34). The process/target semantic relationships found between drama education as provider (process) and ends (targets) such as 'an exciting opportunity to enhance student learning' and attribute / carrier relationships between drama and 'makes learning fun' are instances of the dimension physical distance in which 'the activity becomes the aesthetic object and does not have functional or instrumental significance' (Ladd, 1995, p.34). This attribute /carrier relationship between drama and the clauses 'allows students to experience the messages of stories' and 'responses about experiences cannot be wrong' are both indicative of the dimension wholeness and design as these attributes of drama allow for the judgment and criticism of the object which, in this case, are the experiences of the students themselves. The medium/process semantic relationship between dramatic activity and the clause 'to experience and respond to sensation' is indicative of the symbolic meaning dimension in which the educational activity is valued for its 'truth and revealed meanings' (Ladd, 1995, p.34).

Political valuing, which according to Ladd, (1995), 'lies in the power and control the educator has over the student' (p.34), can be found to a much lesser extent occurring throughout the two curriculum documents analyzed. In fact, political valuing becomes more prevalent in the actual prescribed activities aimed at developing the many drama skills as the power relationship shifts to the teachers' sides. The agent / process semantic relationships between the teacher and clauses/phrases such as 'begins the activity', 'issues instructions through...', and 'creates' are instances where control of activities and resources are shifted into the hands of the teacher. However, it should be noted that this power relationship is a means to an end in which the students are expected to develop the many drama skills that will enable them to complete the assessment tasks that will eventually be given to them.

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Scientific valuing, according to Ladd, (1995), ‘promotes activity which produces new knowledge’ and Ladd further notes that Huebner, (1966) declares that ‘educational activity may be valued for the knowledge which it produces about that activity’ (p.33). Thus in the drama curriculum any activity which is aimed at producing new understanding, skills or factual knowledge is underpinned by scientific valuing based on Huebner’s, (1975), axiological framework. For example, the medium/process semantic relationship between drama and processes such as ‘develop skills, creative thinking, critical thinking and problem solving’ is one such instance where students are not only being taught drama related skills but also general educational skills ‘so that education can evolve and teachers may stay abreast of the onslaught of circumstances’ (Ladd, 1995, p. 34). There seems to be a moderate presence of scientific valuing throughout the drama curriculum documents that adds to the balance of all five categories which according to Ladd, (1995), will ‘provide a rich and meaningful classroom experience and ...realize the promise and possibility of educational experiences’ (p. 35).

A tally of the occurrence of the five types of axiological beliefs in terms of Huebner’s (1975) framework found in the drama curriculum documents that were analyzed produced the relative presence of the categories of valuing as shown in figure 13 shown below.

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Date : 30th June, 2015 Data Source : CAC Teachers' Drama Manual and Drama Assessment Guide

Type of Belief : Axiological

Dimensions	Relative strength – strong / moderate /weak
Technical	Strong
Political	Moderate
Scientific	Moderate
Aesthetic	Moderate
Ethical	Moderate

Figure 13. Relative Prevalence of Axiological Belief Dimensions Found in CAC Drama Curriculum Documents.

In summary, the axiological analysis of the CAC Drama curriculum documents revealed a strong presence of technological valuing which is very much in sync with the general stance adopted in most, if not all, curriculum areas in the primary schools of Trinidad and Tobago today. More importantly however, is the moderate presence of the four other dimensions of axiological beliefs which Huebner, (1975), considers as the optimum approach to curriculum planning as it can provide students with the breadth of experiences that will maximize their benefits from the educational process.

Beliefs Inherent in the Teacher

Axiological, epistemological and ontological beliefs. Raj, the lone participant in this research study, is a thirty-eight year old male teacher currently employed at a relatively high-performing denominational school in the St. George East Educational Division. He is a holder of a Teachers' Diploma in Education from Valsayn Teachers College in Trinidad with an elective in Information Technology and a Bachelor of Education Degree in Language Arts from the St. Augustine Campus of the University of the West Indies. He has been teaching for nineteen years, has taught at all levels in the primary school and has been implementing the CAC for the past two years. The name, Raj, is of course a pseudonym.

Raj was first interviewed in an attempt to unearth his axiological beliefs about the educational process. When asked about the training and preparation he received for the CAC curriculum implementation, he explained that it was insufficient and not in sync with what the Ministry of Education expected to be delivered in the classroom in order to produce the final product especially in the area of art. Raj's reply is very significant and its thematic analysis is shown in Figure 14 below.

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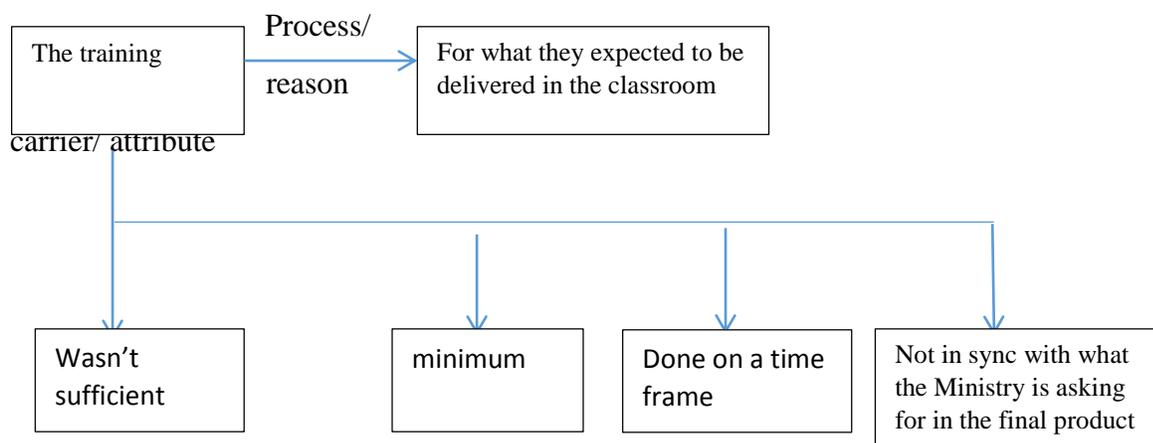


Figure 14. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Part of Axiological Beliefs Interview-Teacher's Beliefs About CAC Training

The process/reason semantic relationship between 'training' and the clause 'for what they expected...' which is modified by the adjectival clauses 'wasn't sufficient', 'minimum' and 'not in sync...' implies that Raj believes that the CAC training must cover all skills and required knowledge needed to ensure the teacher's efficacy at teaching (or delivering as Raj said) the prescribed aspects of the various subject areas in the curriculum. Knowledge and skills are seen as being first learnt and developed by the teacher and then transferred or delivered to the pupils during the act of teaching. This appears to be a realist philosophical position with a simple and certain view of knowledge where reality is external and unchanging and can therefore be learnt and re-organized in ways that children can learn very easily. The teacher must become the authority through training and he will assist the students in justifying what they learn under the CAC curriculum. The use of the terms 'final product' and 'done in a time frame' in the attribute clauses seem to point to technological valuing where emphasis is placed on achieving pre-set goals in the most efficient manner possible. This conclusion is also supported by Raj's declaration which is thematically analyzed in Figure 15 below.

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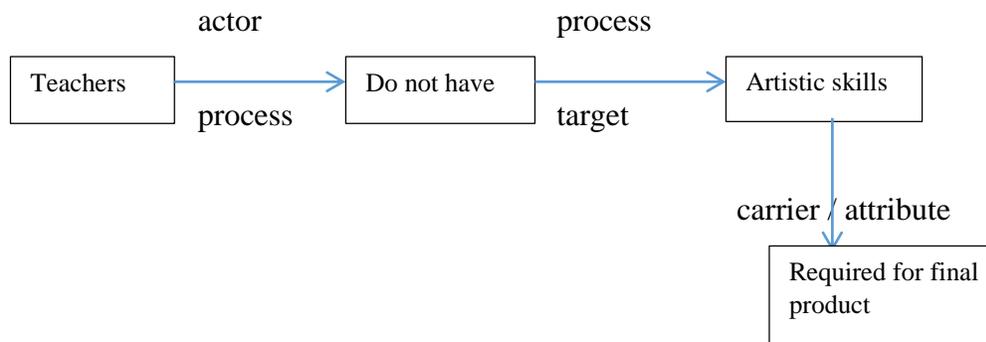


Figure 15. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Part of Axiological Beliefs Interview-Self-Efficacy Beliefs (CAC)

Raj indicated that he does not believe that teachers have the requisite artistic skills necessary to teach students to produce a high quality final product. Both technological valuing in which the achievement of a pre-determined end (final product) through set procedures (skills) and the simplistic ontological stance of simple and certain knowledge are implied in this statement and are symbolic of the realist philosophical beliefs apparently held by Raj. The final product can only be effectively produced if the required skills and knowledge are first developed by students.

Implicit in Raj's response about the level of training for CAC is also the issue of political valuing in which political control is exercised by one person or group over another. The absence of resource personnel and the limit put on training time are both instances where the Ministry of Education is exercising its political control by withholding or limiting the availability of these resources while at the same time providing materials needed by students. Figure 16 shows the thematic analysis of Raj's views on the support provided by the Ministry of Education. The pronoun 'you' refers to the classroom teacher and 'nothing there' refers to the unavailability of capable resource personnel to support the classroom teacher in grasping the intricacies of the

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subject matter. Here again there is evidence of Raj's realist stance in which he sees knowledge as external and transferable.

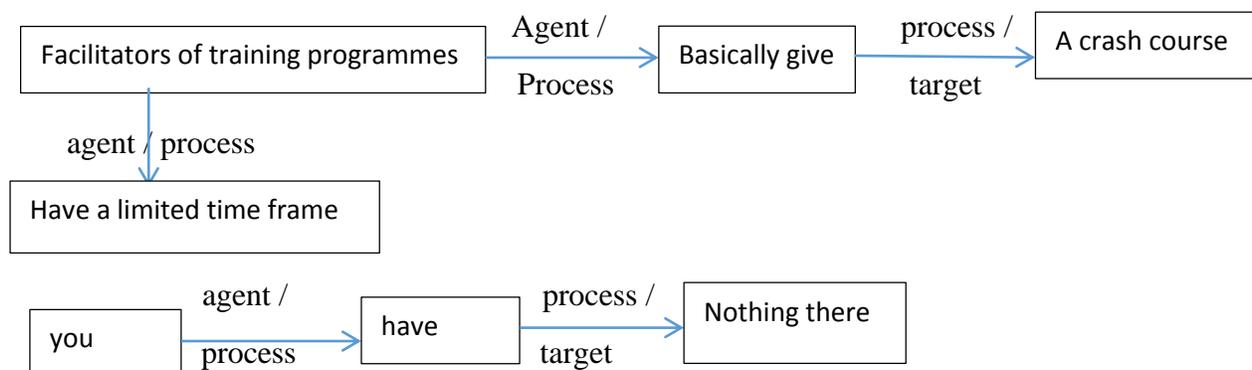


Figure 16. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Part of Axiological Beliefs Interview-Teacher's Beliefs About CAC Training

When asked about what is most important to him as an educator, Raj expressed his desire to fulfill every child's potential and he went on to link this response to the question about what was his most important role as an educator. He described some of the things he does to fulfill what he termed the child's potential. Figure 17 below shows the thematic analysis of Raj's response to what is important to him as an educator and his most important role as an educator.

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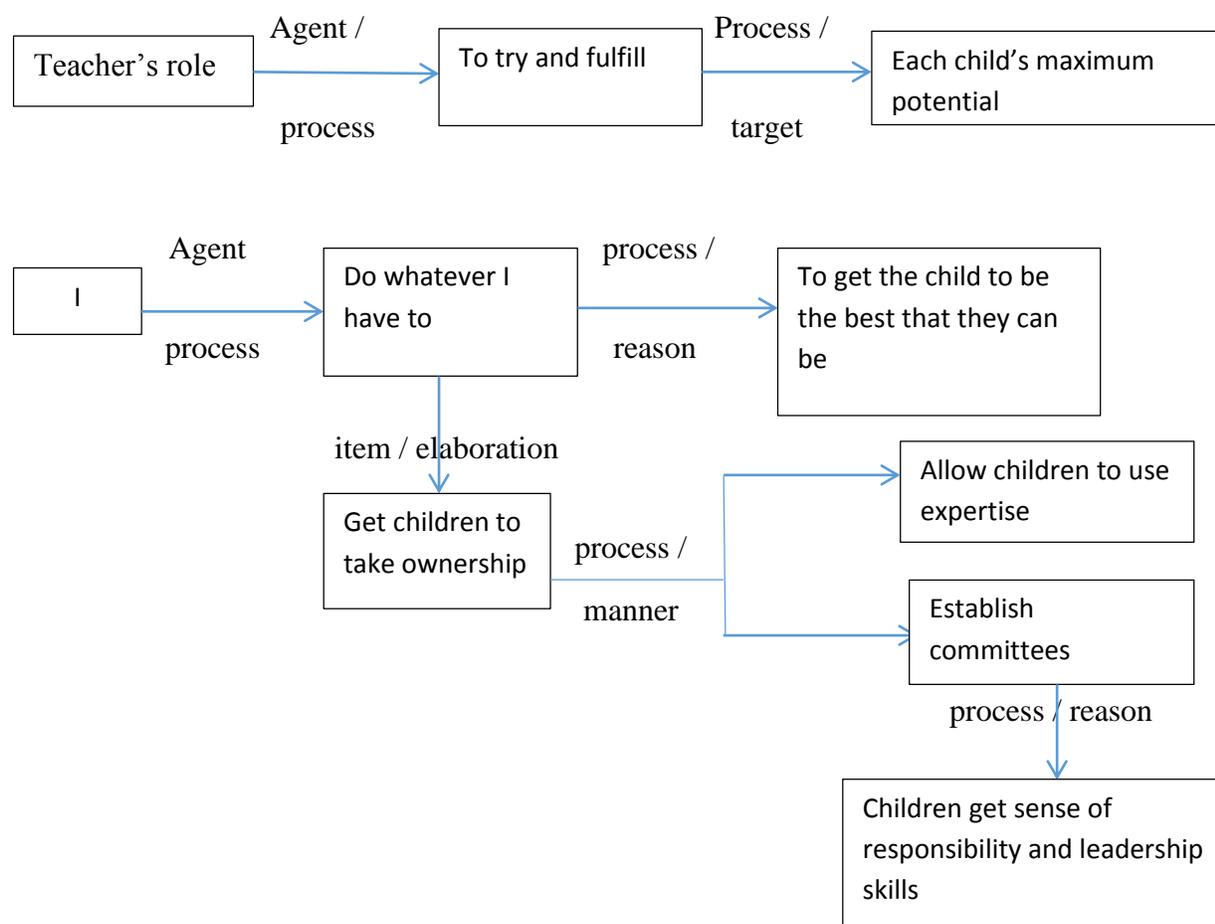


Figure 17. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Part of Axiological Beliefs Interview-Beliefs About Most Important Role

The agent/ process semantic relationships in the analysis indicates political and technological valuing where the power of control is vested in the teacher as it appears that he decides what is to be done to fulfill the students' potential possibly after figuring out what this potential is himself. The use of the verb phrases 'try and fulfill' and 'do whatever I have to do' as part of the agent/process relationship, seem to suggest that the effort comes from the teacher, and his actions rather than those of the students, will help the pupils achieve their potential. This conclusion is further justified by his stated actions in which the establishment of committees and use of children's 'expertise' or their academic strengths in managing the classroom are given as

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examples of how the achievement of maximum potential takes place because it's the teacher who establishes the committees and he decides who are experts and who are not. This situation regarding the achievement of maximum potential, under which leadership skills and a sense of responsibility appears to be subsumed, also indicates technological valuing as everything is organized around the achievement of pre-set goals, that is, whatever the child's potential may have been determined to be, possibly using the most efficient means available. The use of experts also points to the simple and certain view of knowledge held by the teacher which, of course, is realist in nature.

Figure 18 below shows the thematic relationship between the clause 'the most important thing the teacher teaches' and Raj's responses to a question on that issue. The item / elaboration, logical, semantic relationship found between the clauses below highlight technological, aesthetic and ethical valuing as informed by Huebner's framework. The declaration that students must contribute and not become burdens to society points to a 'sociological analysis of the individual in the present or future social order' (Huebner, 1966 as cited in Ladd, 1995, p. 32) which the teacher will use to inform the outcomes of education and hence what is taught in the classroom. It also indicates an economic concern geared towards efficiency and production. This is a clear subscription to technological valuing. The phrase 'spiritual knowledge / understanding / religion' is an instance of ethical valuing in which 'the educational activity is life and life's meanings' (Ladd, 1995, p.34) as it speaks to the relationships between man and God and eventually man and man as dictated by the laws of religion. The clause 'life beyond SEA' is subject to interpretation and the interviewer erred when an explanation wasn't elicited from the interviewee, however, based on the interviewee's utterance, "at the end of the day, don't be too myopic," in reference to the students view of life and their attitudes towards the Secondary

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Entrance Examination, the clause was interpreted to mean that academic studies (of which SEA is symbolic) is not the only important facet of education and hence life as there are other non-academic issues that will contribute to the development of a good citizen such as religious and spiritual understandings. This appears to be aesthetic valuing as the teacher seems to be talking about holistic education in which ‘the possibility and significance of life [is] symbolized through educational activity’ (Ladd, 1995, p. 34).

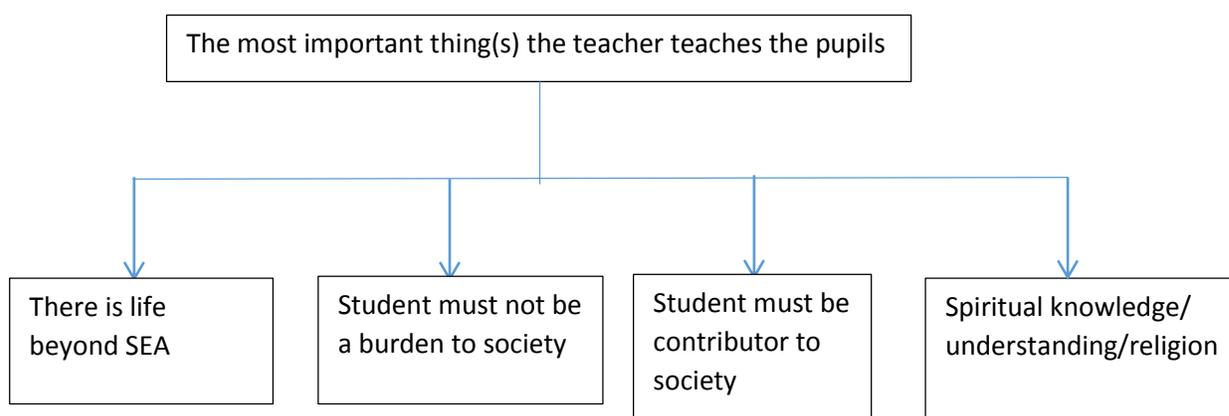


Figure 18. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Part of Axiological Beliefs Interview-Beliefs About Teacher's Focus

The teacher's beliefs about what is most important to the Ministry of Education and who decides what is of importance, was explored next. Figure 19 below shows the thematic analysis of the Raj's views on these matters.

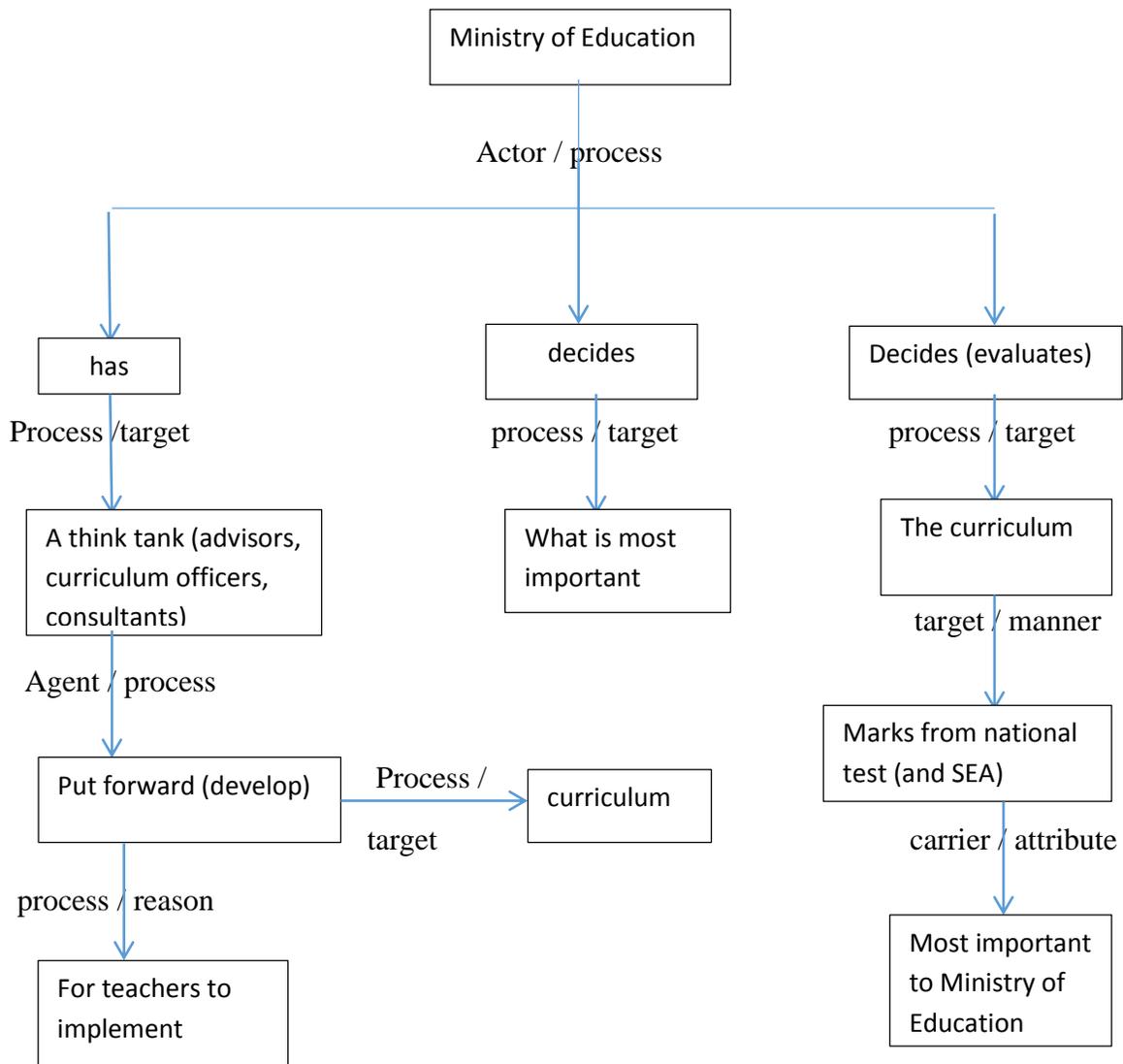


Figure 19. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Part of Axiological Beliefs Interview-Beliefs About MOE's Focus

The agent / process semantic relationships among developing curriculum, evaluating curriculum and deciding what is most important in the educative process, and the Ministry of Education, at least in the mind of the teacher, shows the political beliefs inherent in the mind of the teacher

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with regards to curriculum development, implementation and evaluation. The teacher appears to feel quite powerless in the relationship and the technological approach undergirds the entire curriculum process as it is based on economic rationality and efficiency as described previously.

Raj's beliefs about assessment were brought under the spotlight in the next question of the interview. The prevalence of political valuing, in which the power of the teacher over the student, is highlighted both in the agent/process semantic relationship between the teacher and the evaluation process with the students occupying the target position and the use of the obligatory 'had to produce' and 'explain' verb phrases as used with respect to the project evaluation.. All evaluations came from the teacher whereas opportunities for peer or self-evaluations were not considered. The underlying realist philosophical belief is further affirmed by the teaching-learning-assessment arrangement of the educative process and the use of paper and pencil tests and even possibly oral questioning if this dialogue took the form of Lemke's triadic dialogue in which a question is posed, the answer offered and an evaluation of the answer given by the teacher. The use of observations and project assessment can indicate a complex ontological stance but this depends on the nature of the observations, that is, if previously taught skills were being evaluated, then this can point to a simple and certain ontological stance. If the project assigned evaluated pupils' ability to create and evaluate their own work and not reproduce something previously taught then this would indicate a complex ontological stance. All of these issues point to weaknesses in the interview process that need to be reviewed to capture data more accurately or classroom observations need to be included as part of the data collected and analyzed. Figure 20 below illustrates the thematic analysis of Raj's responses to questions about the assessment process.

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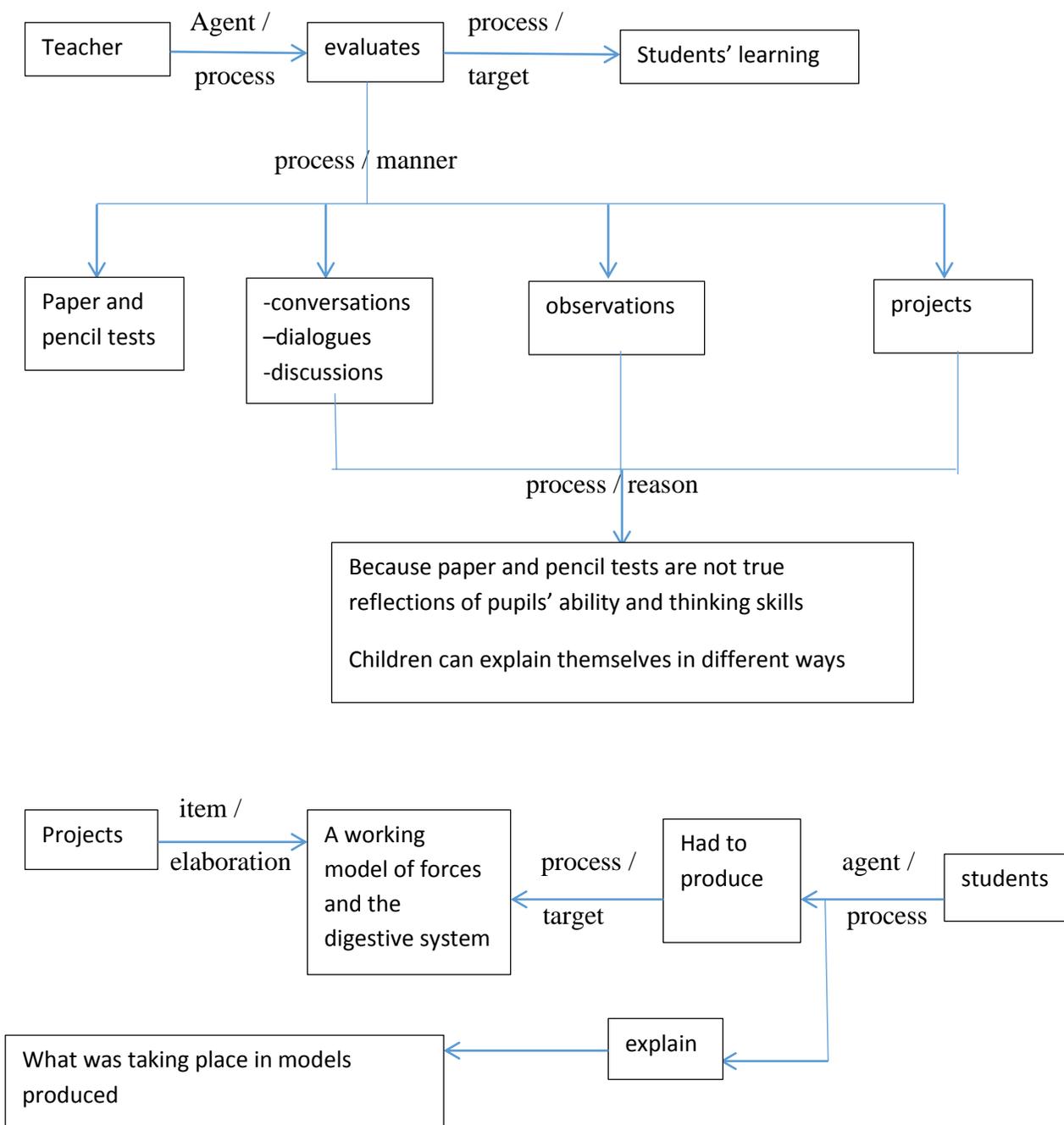


Figure 20. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Part of Axiological Beliefs Interview-Beliefs About Assessment

When asked what he thought CAC was all about and which of the many areas of CAC he would readily include in his classroom programme, Raj identified drama, an ill-structured domain, as his first choice and gave an explanation that has been analyzed in figure 21 shown

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below. An analysis of his beliefs about the CAC reveals that he believes that the MOE uses CAC to encompass the many areas of the curriculum as contributors to the total score that students achieve at the Secondary Entrance Assessment, hence his use of the clause ‘to make it count’. Thus he appears to believe that the CAC is being used as a means to ensure all areas of the curriculum are being addressed by making it part of the grading and assessment scheme used to place students in secondary schools. This implies the presence of both political and technological valuing as the Ministry asserts power through the CAC to ensure attention is paid to what many believe are the neglected areas of the curriculum and the use of marks, specific objectives and prescribed strategies is a symbol of economic rationality and technological valuing as emphasis is given to efficiency in the process of implementation. There is evidence of aesthetic and ethical valuing inherent in the beliefs of the teacher as shown in the nominal semantic relationship between CAC and the attributes he identified. The enjoyment, fun and all-round or holistic development identified as attributes by Raj indicates aesthetic valuing and the self-esteem and self-confidence are ethical in nature thus pointing to a complex ontological and epistemological, non-realist stance in the domain of drama.

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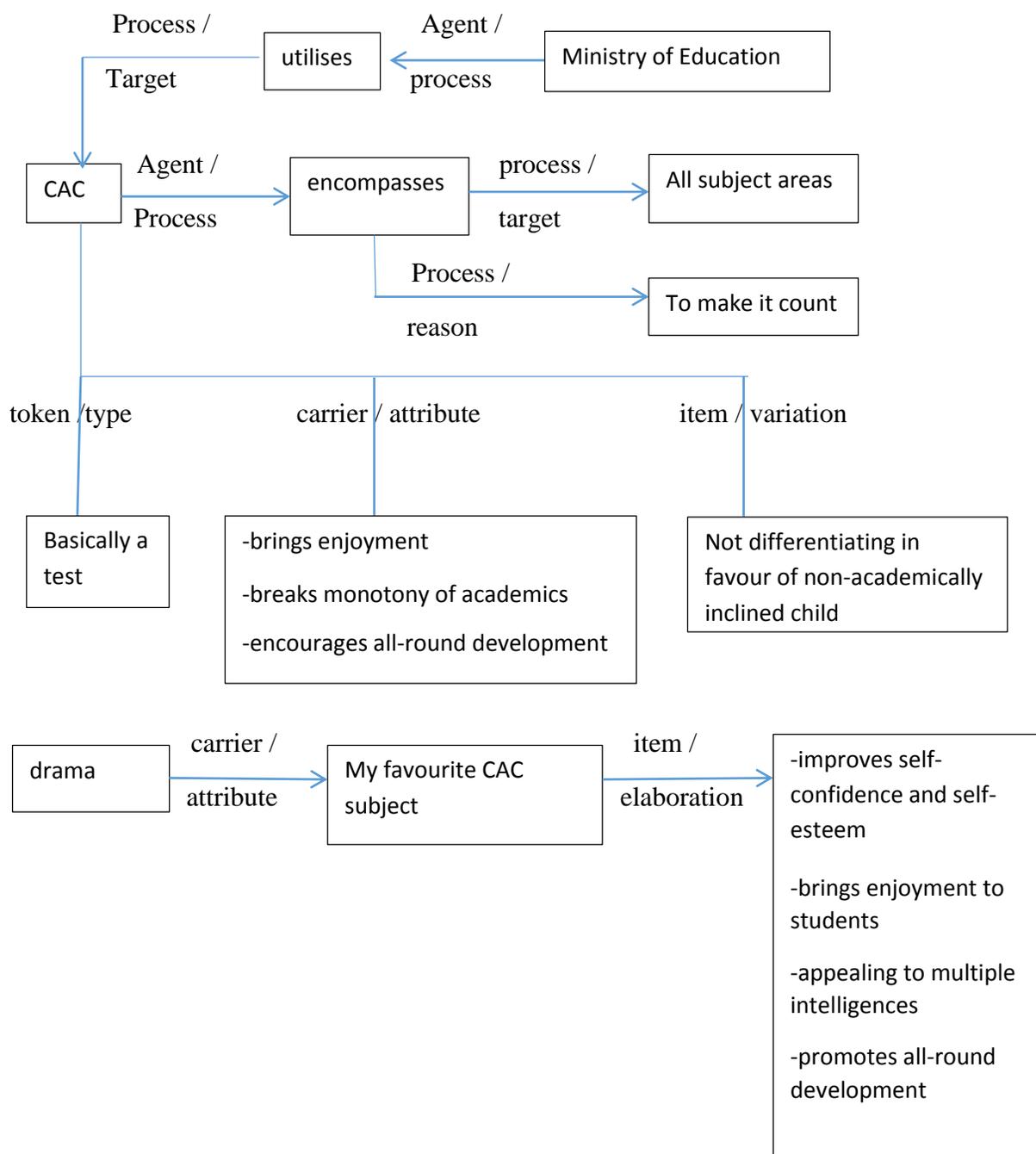


Figure 21. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Part of Axiological Beliefs Interview-Teacher's Beliefs About CAC

The interview specially designed to ascertain Raj's epistemological and ontological beliefs was next conducted. Although some evidence of these beliefs was found in the previous

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interview, a more detailed and probing set of questions are necessary to really ascertain these particular beliefs. When asked about how successful he was at implementing the CAC, Raj replied that he could have been better at Agriculture and he did not have the artistic skills to effectively demonstrate them to his students and had to rely on YouTube for assistance. The possessor / possessed transitivity semantic relationship between the teacher and the artistic and agricultural skills imply a realist position on the Greene et Al.(2010), model since it seems Raj subscribes to a simple and certain view of knowledge where the existence of certain basic skills are assumed and are to be transferred to the students. He also appears to believe that the students must look to him (an authority) for justification of what is real knowledge since implied in the thematic relationship is the belief that the teacher must first own the skills or knowledge, pass it on to the students through demonstration and evaluate their performances. The thematic analysis of Raj's responses about his background knowledge in the various areas of CAC and his personal attitude towards the curriculum policy is shown in figure 22 below. Raj seems to have a positive attitude towards CAC generally from the nominal semantic relationship identified as carrier / attribute when he describes it as 'not a bad thing' and 'a good self-developmental programme for the child'. However, he does express some concerns about losing quality over quantity and being burdensome to the child. The attribute self-developmental assigned to the CAC by Raj seems to indicate a belief that the knowledge, skills and understanding are being constructed by the students themselves but this is not sufficient to place him in a non-realist position in the theoretical model. However, Raj's observation that children are given the opportunity to develop and nurture their ideas in CAC creative writing points to a rationalist philosophical stance as justification of knowledge will no longer be from authority alone and knowledge is no longer of the simple and certain nature associated with the most basic ontological position.

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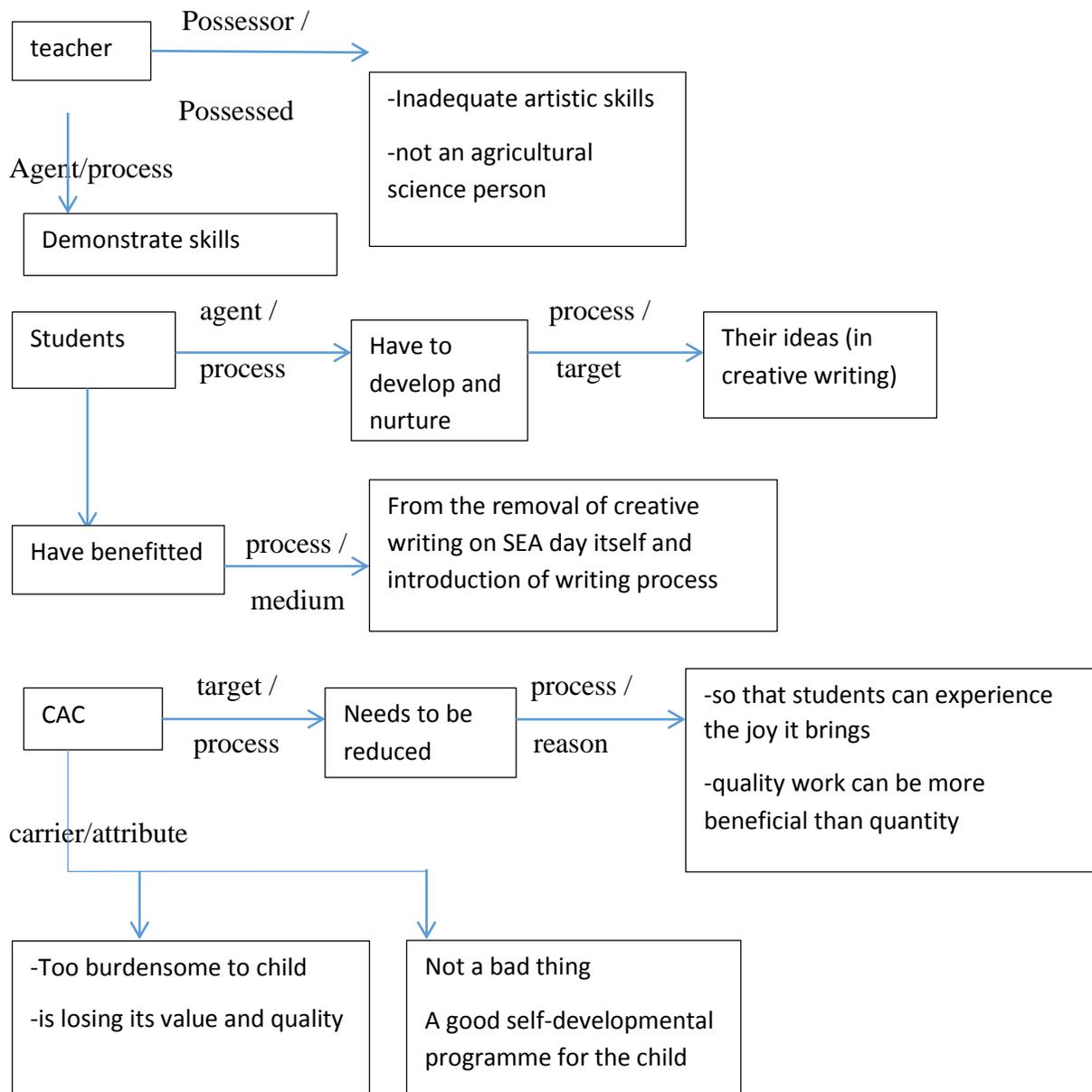
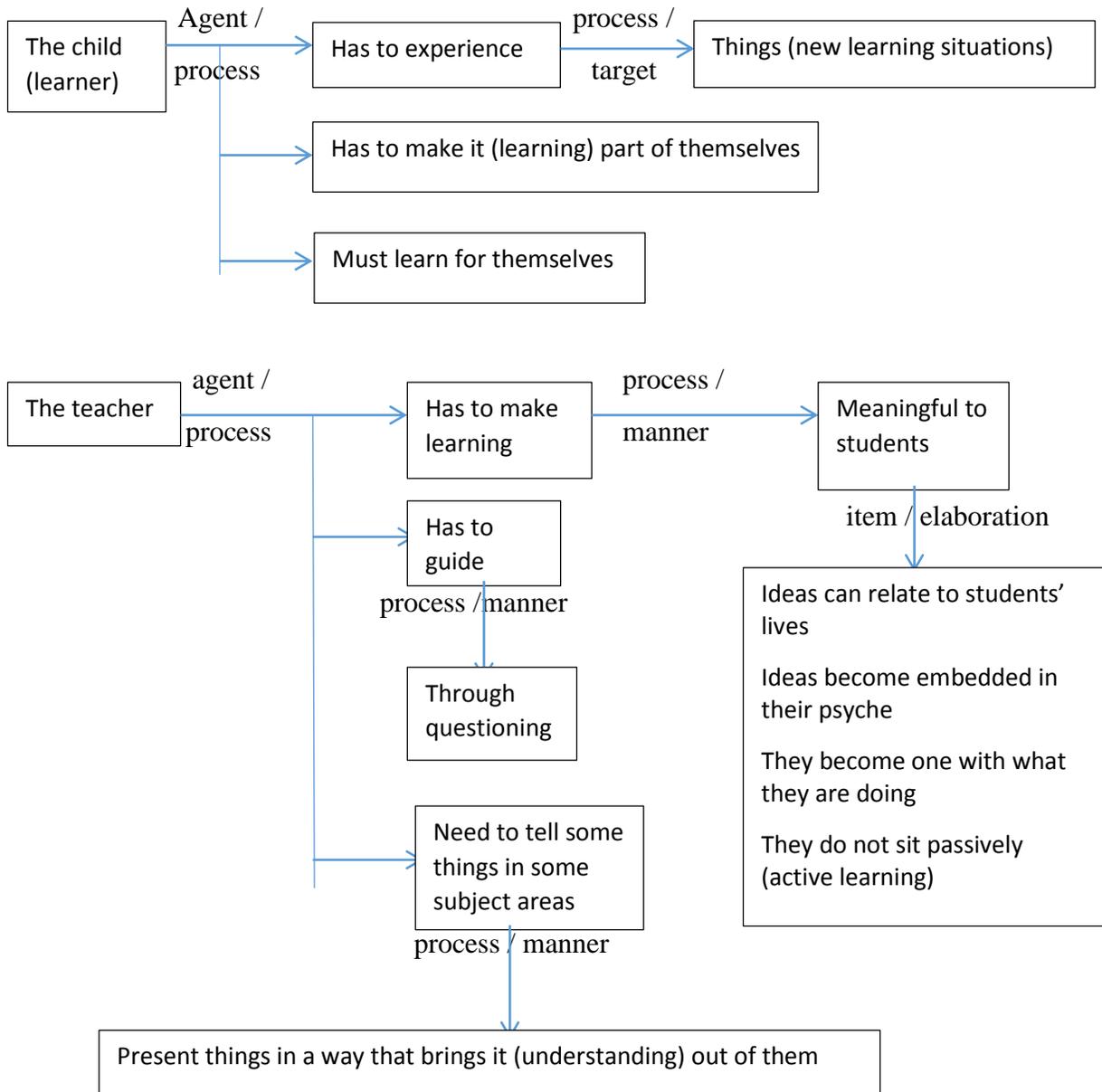


Figure 22. Thematic Analysis using Lemke's,(1990) method. Shows analysis of Part of Epistemological and Ontological Beliefs Interview-Teacher's Beliefs About Background Knowledge and Attitude to CAC

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The next question focused on Raj’s views about how students learn. Figure 23 below shows the thematic analysis of his responses to this very philosophical issue.



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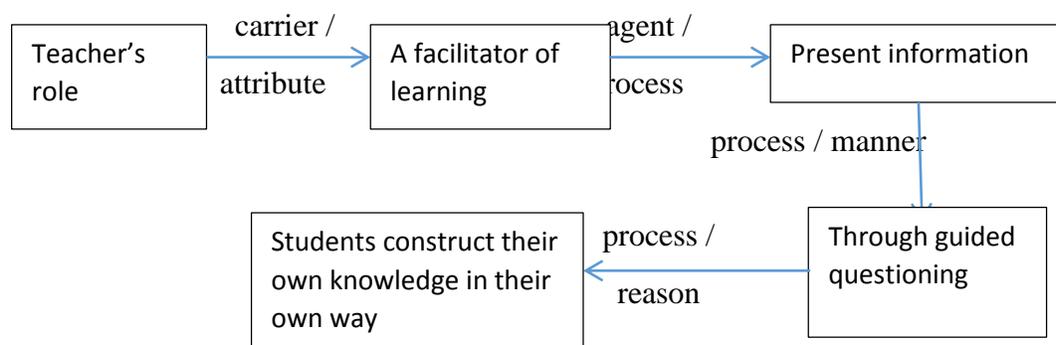


Figure 23. Thematic Analysis using Lemke's, (1990) method. Shows analysis of Part of Epistemological and Ontological Beliefs Interview-Teacher's Beliefs About How Students Learn and the Teacher's Role in the Learning Process

The agent /process transitivity semantic relationship between the child on one hand, and the clauses “has to experience”, “must learn for themselves”, and “has to make it part of themselves” on the other, appears to indicate that the teacher believes that learning is an active process that takes place within the learner and done by the learner. Furthermore, Raj explains that the teacher has to guide the learning process through questioning and presenting information in certain ways so that students engage actively with the learning situation and construct their own knowledge. All of this indicates a high belief in personal justification on the part of the students possibly with some reliance on authoritative and other means of justification. The use of the clause “guide the learning process through questioning and presenting information” suggests that the knowledge is, at least in the mind of the teacher, pre-existing and students are being guided to discover what the teacher wants them to learn. This suggests a realist perspective in terms of Greene et al, (2010), model and a strong political and technological valuing with a weaker presence of aesthetic valuing in terms of Huebner's, (1975), axiological beliefs framework.

Figure 24 below shows the thematic analysis of Raj's responses when asked about what kinds of things students should learn in science and drama.

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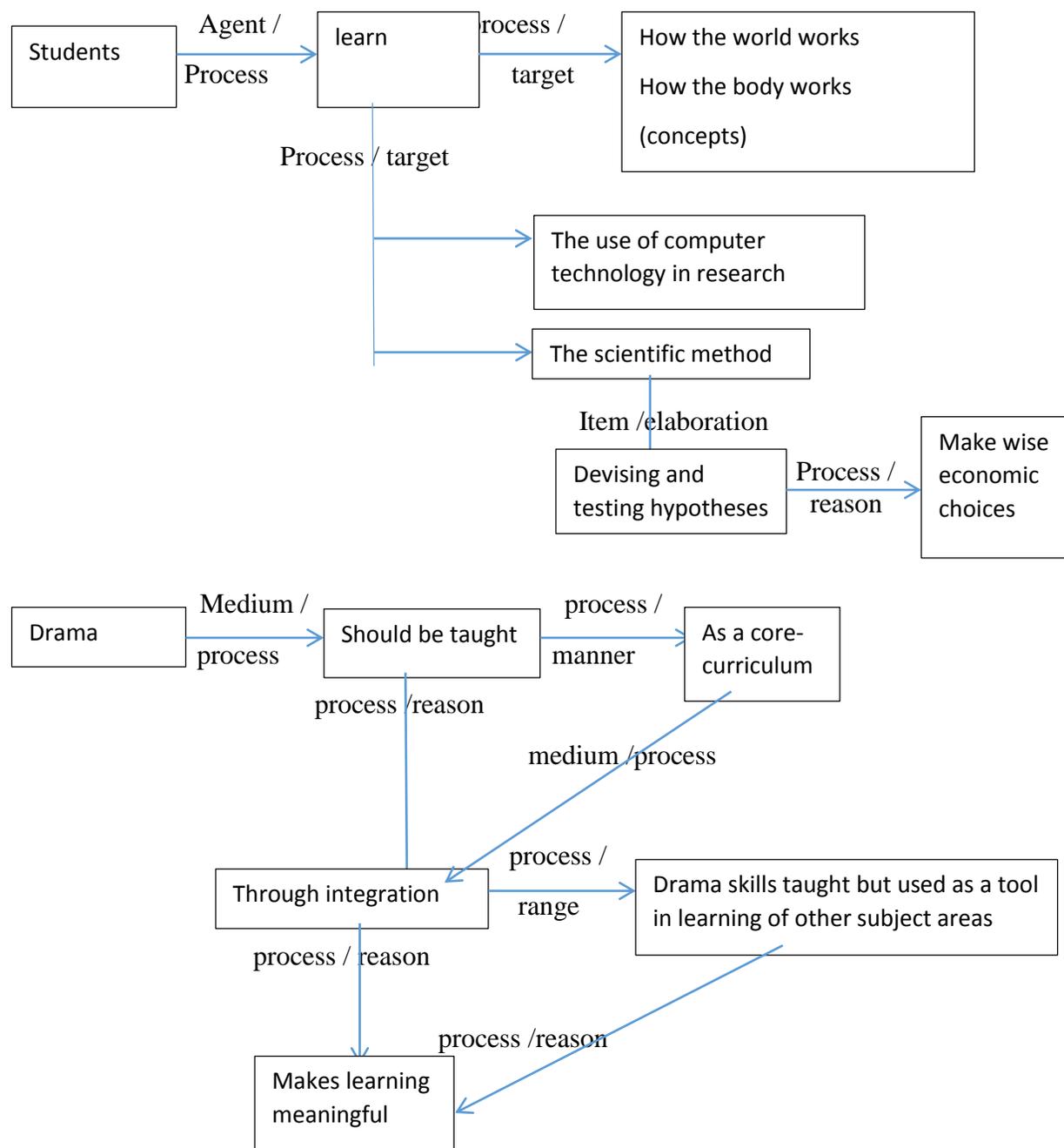


Figure 24. Thematic Analysis using Lemke's,(1990) method. Shows analysis of Part of Epistemological and Ontological Beliefs Interview-Teacher's Beliefs About What Students Should Learn in Science and Drama

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The transitivity semantic relationships of agency / process and process / target among the students, the process of learning and the two big scientific ideas, 'How the World and Body Works' implies the epistemological belief that knowledge is constructed by the students but there is a pre-existing body of knowledge independent of the learner which must be acquired in the ways suggested. Raj further suggests that computer-based research skills and the many process skills associated with the scientific method be learnt as tools for students to be able to learn independently. The thematic analysis suggests that Raj holds a simple and certain view of knowledge, a simplistic ontological belief, but seems to be of the view that structured interaction between the learner and the learning situation will assist students in building their own skills and concepts in science through personal and authoritative justification through the use of the computer research skills and use of the scientific method.

With respect to Drama, an ill-structured domain, the medium / process transitivity semantic relationship between drama as a core-curricular area and the process of integration into other subject areas to produce meaningful learning seem to suggest a rationalist perspective in terms of the Greene et al, (2010), theoretical model. This approach assumes no simple and certain view of drama concepts and skills but rather a more relativistic stance in which students will develop skills and knowledge of drama while using these as tools in learning in other curriculum areas. The skills and knowledge will be developed as students use several means of justifying true knowledge such as personal, social, authoritative and possibly others.

The next two questions sought to enquire about the kind of interactions that are encouraged in the classroom and how the teacher decides what to teach and what not to teach in his classroom. The medium / process transitivity semantic relationships found between classroom interactions and the areas highlighted in figure 25 below indicate the more complex

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rationalist ontology and epistemology where knowledge and truth is constructed in the mind of the child and justified in several ways including personal, social, authoritative and possibly other means. Through extended dialogue and computer-assisted research pupils critically analyse presented learning situations to extract and justify truth or knowledge.

Raj explained that the National Primary Schools Curriculum prepared by the Ministry of Education prescribes what is to be taught at each level however he contends that during classroom interactions, the students are given the opportunity to carry the learning into any relevant direction based on their interest so that ideas that are not prescribed may be learned while prescribed learning may be done greater detail or at higher levels than actually required by the curriculum. The classroom dialogue is allowed to take its course along the road of relevance which, of course, is most likely determined by the teacher and it is along these lines that a lot of learning takes place. There is a great presence of political, aesthetic and ethical valuing in this classroom as the teacher transfers a lot of control to the children although he holds on to the ultimate say in what happens. Raj appears to be subscribing to a rationalist ontology and epistemology as he encourages the students to construct their own knowledge through personal, social and authoritative justification. His approach seems to underscore a complex relativist ontological stance where truth is subjective in nature and actively constructed by individuals or groups. Therefore, in spite of the control of what is to be taught in the classroom by the prescribed curriculum, opportunities are created during lessons to allow for exploration, critical analysis and deepening of knowledge and understanding.

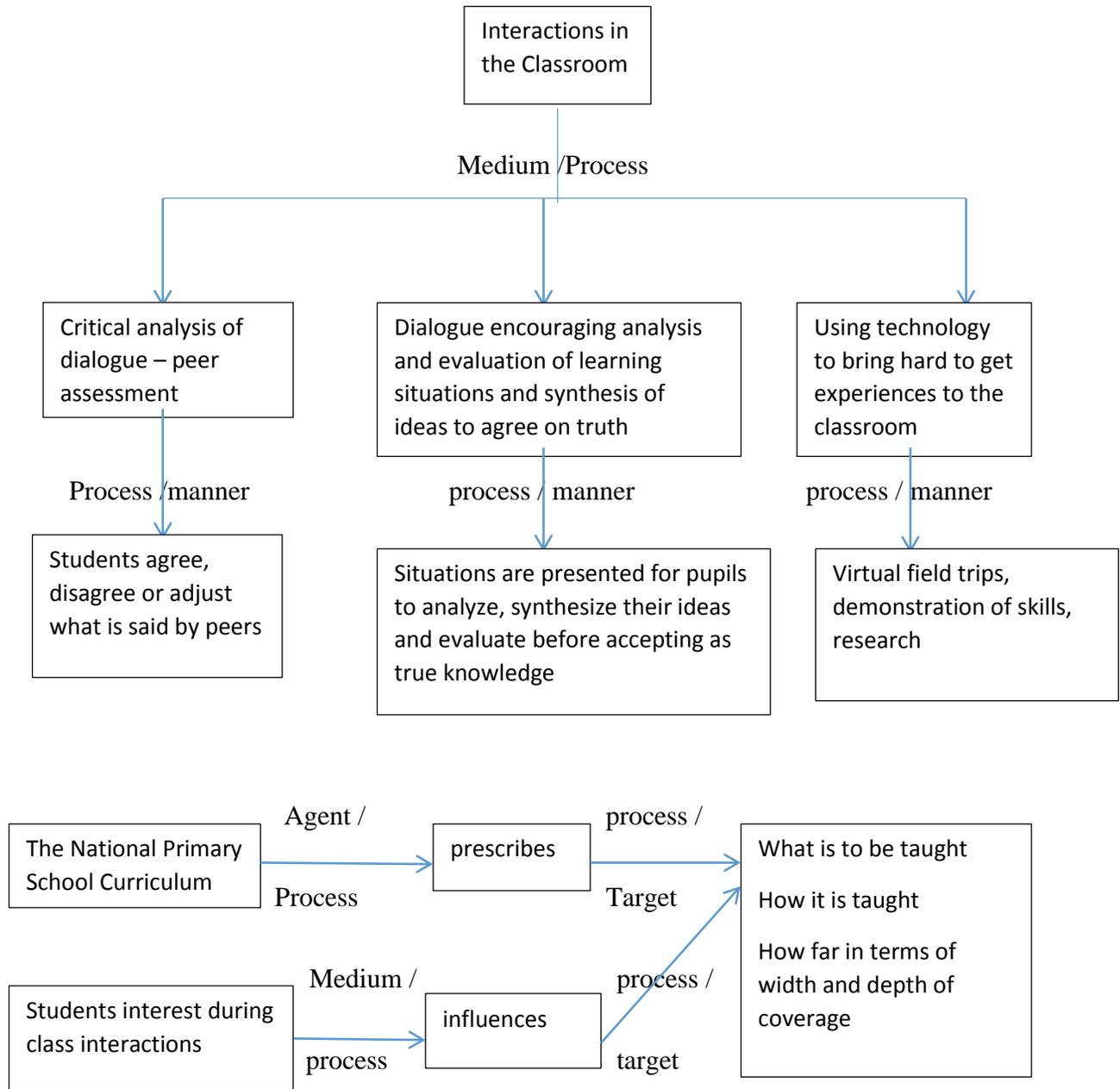


Figure 25. Thematic Analysis using Lemke's,(1990) method. Shows analysis of Part of Epistemological and Ontological Beliefs Interview-Teacher's Beliefs About Classroom Interactions and What should and Should not be Taught.

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Figure 26 below shows the thematic analysis of the teacher beliefs about perceiving when learning is taking place in the classroom and how students' learning is assessed. Raj indicated that verbal and non-verbal communication is the main key to ensuring or determining whether or not learning is actually taking place during a lesson. The hyponymic semantic relationship in the diagram shows the types of activities that are considered as indicators that students are learning. The verbal and non-verbal communication outlined in the thematic analysis indicates that Raj does not rely only on recall or regurgitation of facts learned to ensure learning is taking place but seems to be aware that the act of learning involves much more since he uses such signs as facial expressions, other forms of body language and most importantly, conversation, as this is a fairly accurate way of understanding someone's thought patterns. The dialogue will provide the opportunity for the teacher to assess the internal learning process that is mediated through language to ensure that the student is constructing knowledge that is socially acceptable or deemed correct. These actions point to a realist position on the Greene et al, (2010), theoretical model where there is still strong belief in simple and certain knowledge but equally strong beliefs in authoritative and personal justification.

Raj's position on the determination of students understanding, that is, assessment, is based on the student's ability to apply learnt concepts to new situations and explain their reasoning or stance taken. The approach to assessment seems to assume a simple and certain view of knowledge that can be applied effectively and its use personally justified by the pupil. There seems to be a strong belief in personal justification by Raj as a good indicator of pupils' understanding of concepts which indicates a realist position in the theoretical model.

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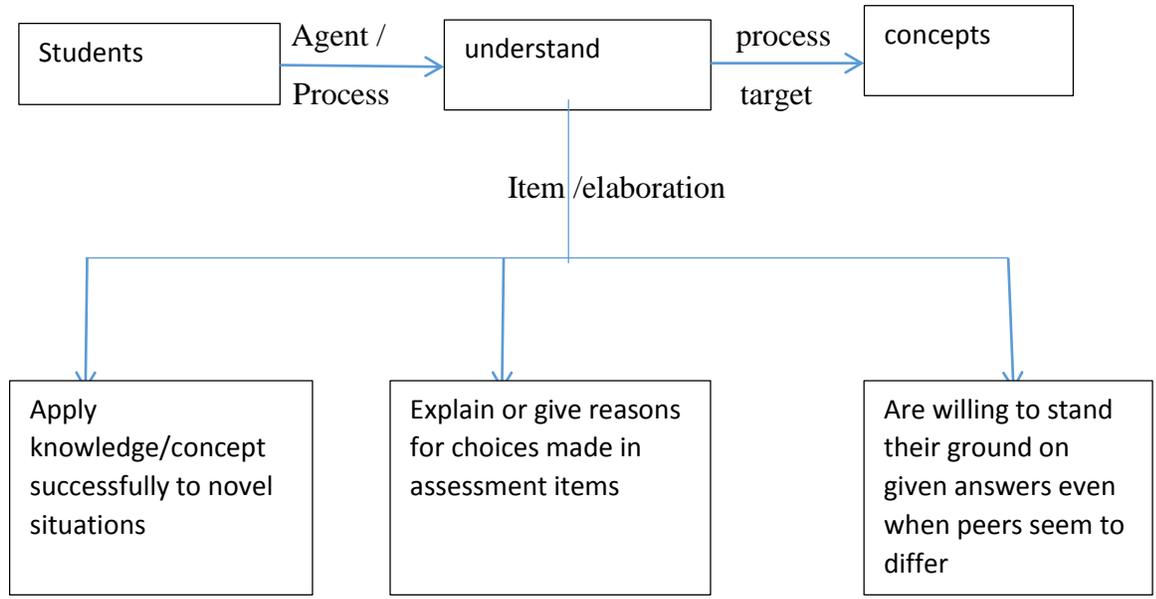
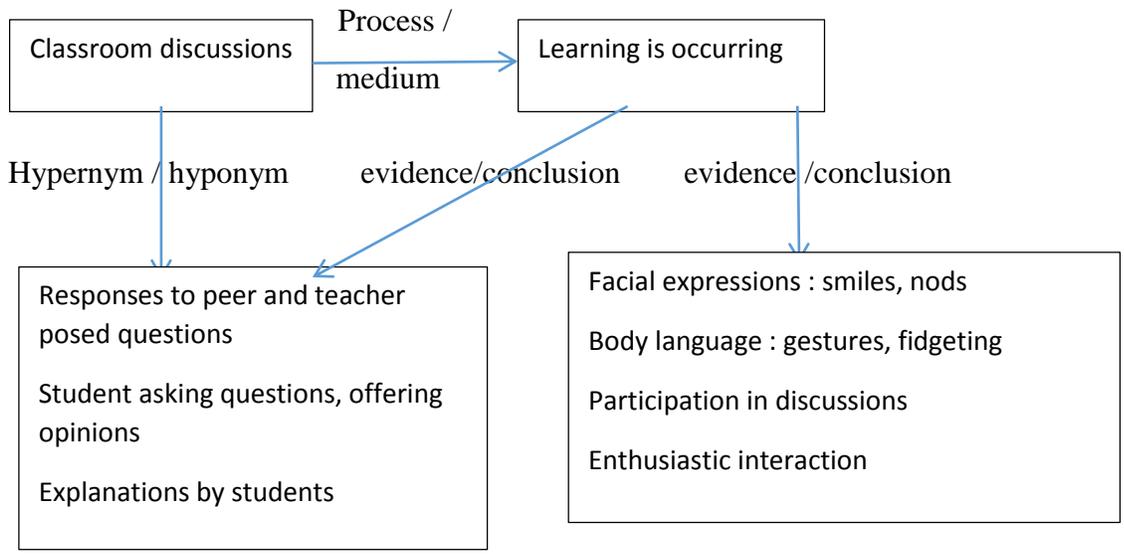


Figure 26. Thematic Analysis using Lemke’s,(1990) method. Shows analysis of Part of Epistemological and Ontological Beliefs Interview-Teacher’s Beliefs About when Students are Learning in the classroom and when they have understood

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The tables below summarize the epistemological and ontological belief dimensions in terms of Greene et al., (2008, 2010) theoretical model and the dimensions of axiological values in terms of Huebner's, (1975), framework, as ascertained from the interviews done with the research subject.

Data Source : Teacher Interviews

Type of Belief : Ontological / Epistemological

Dimensions	Relative Strength - strong/moderate/weak
Simple and Certain Knowledge	strong
Justification by Authority	Strong
Personal Justification	Strong
Other Means of Justification	Weak

Type of Belief : Axiological

Dimensions	Relative strength – strong / moderate /weak
Technical	Strong
Political	Strong
Scientific	Weak
Aesthetic	Moderate
Ethical	Weak

Figure 27. Shows relative presence of beliefs held by teacher

Summary of Chapter

In this chapter, the beliefs inherent in the curriculum documents of both CAC Drama, an ill-structured domain, and CAC Science, a well-structured domain, have been extracted as accurately as possible in order to determine the underlying ontological, epistemological and axiological beliefs that have influenced the curriculum orientations. In the case of drama, there was some anomaly between the espoused beliefs implied in the preamble to the actual classroom strategies and the strategies themselves. This was followed by an attempt to ascertain the ontological, epistemological and axiological beliefs held by a teacher currently implementing both areas of the CAC curriculum. The researcher recognized the need to first pilot the interview protocol so as to identify and correct shortcomings in the process. Some issues were more probing questions, clearing up of the intended meaning or certain utterances by the interviewee and the seeking out of more examples of classroom practices that could help to bring clearer understanding of some statements made. Nevertheless, the beliefs were ascertained as accurately as possible so that they can be compared and contrasted against those inherent in the curriculum itself to determine if there was congruency in the beliefs of both players in the curriculum process, an essential element in successful curriculum implementation (Fullan, 2007; Rogers, 2003).

Chapter 5 - Summary of Findings and Recommendations

This chapter begins with a short summary of the research done, its purposes, underlying conceptual framework and methodology. This is followed by a presentation and discussion of the findings in light of theoretical framework used and the research questions to be answered. The chapter is concluded with recommendations for consideration by education planners and class teachers and possibilities for future research.

Summary

The purpose of this study was to determine whether the epistemological, ontological and axiological beliefs of one teacher currently implementing the drama and science components of the CAC of SEA were congruent with those very beliefs inherent in the curriculum documents provided by the Ministry of Education. To achieve this purpose, two main questions were researched:

1. What are the epistemological, ontological and axiological beliefs inherent in the curriculum documents produced by the CAC developers?
2. What epistemological, ontological and axiological beliefs underpin the pedagogical practices of the teacher currently successfully implementing the CAC curriculum innovation?

Research has clearly shown that curriculum is mediated by the presence of teacher's beliefs, to more often than not, produce an enacted curriculum quite different from that intended by the developers (Coburn, 2003; Fullan; 2007; Rogers, 2003; Wallace & Priestley, 2011) so that the results of this study can give a fair indication of whether the curriculum has been implemented with fidelity or otherwise.

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The theoretical model used to inform the study of epistemological and ontological values was based on the theoretical model, The Epistemic and Ontological Cognition Model, by Greene, Azevedo and Torney-Purta, (2008, 2010), and axiological values were viewed through Huebner, (1975), framework of axiological valuing which was specially designed for curriculum theory.

The generic case study approach used, sought to access rich, thick data that would bring deep understanding of the belief processes at work in the implementation of the CAC curriculum and involved collecting data through interviews and document analysis. Lemke's, (1990), thematic analysis was used to analyze all discourses in order to ascertain the underlying beliefs in both the curriculum documents and the teacher currently enacting the curriculum in a classroom.

Findings

Figures 28 and 29 provide a comparative summary of the axiological values and epistemological and ontological beliefs respectively held by the teacher and inherent in the CAC science and drama curriculum documents. These findings are represented in the bar charts shown in figures 30 and 31 to give a more visual representation of the extent to which these beliefs are held in each of the three areas of study.

The data indicate what appears to be a Realist position in terms of the Epistemic and Ontological Cognition Model proposed by Greene et al., (2008, 2010), as both teacher and the science curriculum documents seem to be undergirded by strong beliefs in the simple and certain view of knowledge, personal justification and justification by authority. This philosophical stance is further underscored by moderate to strong axiological beliefs in the technological and political dimensions of Huebner's, (1975) framework, all of which are indicative of a simple and certain view of reality in which knowledge, being external to the learner, is organized into

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educational objectives or goals and transferred to the learner who must internalize it through justification with the teacher being the authority who would give the final judgment on the veracity of students' learning. Notable also is the weak beliefs in other means of justification possessed by the teacher and inherent in the science curriculum which not only supports the theoretical model proposed by Greene et al., (2008, 2010), but further strengthens the Realist stance in both. It must be noted that these findings are based on inferences, which are 'fraught with difficulty because individuals are often unable or unwilling, for many reasons, to accurately represent their beliefs' (Rokeach 1968, cited in Pajares 1992, p. 314). They were made by the researcher based on a conversation with the teacher and could have been further verified by classroom observations over an extended period to ensure that the teacher's espoused beliefs and actual classroom practices are in sync. This fact points to a possible weakness in the methodology.

However, the beliefs inferred from the drama curriculum documents have shown some marked differences with those apparently held by the teacher. The drama curriculum seems to be informed by rationalist philosophical beliefs where knowledge is no longer simple and certain and justification of what is truth appears to be multi-dimensional as it can be personal, through authority and by other means including social. Nevertheless, at the classroom level, the implied beliefs were overwhelmingly realist as there was great focus on drama skills and teacher-centred side-coaching to provide authoritative justification to the demonstration of those skills by students thus rendering the teacher's beliefs and those in the drama curriculum to be enacted at the classroom level to be quite compatible

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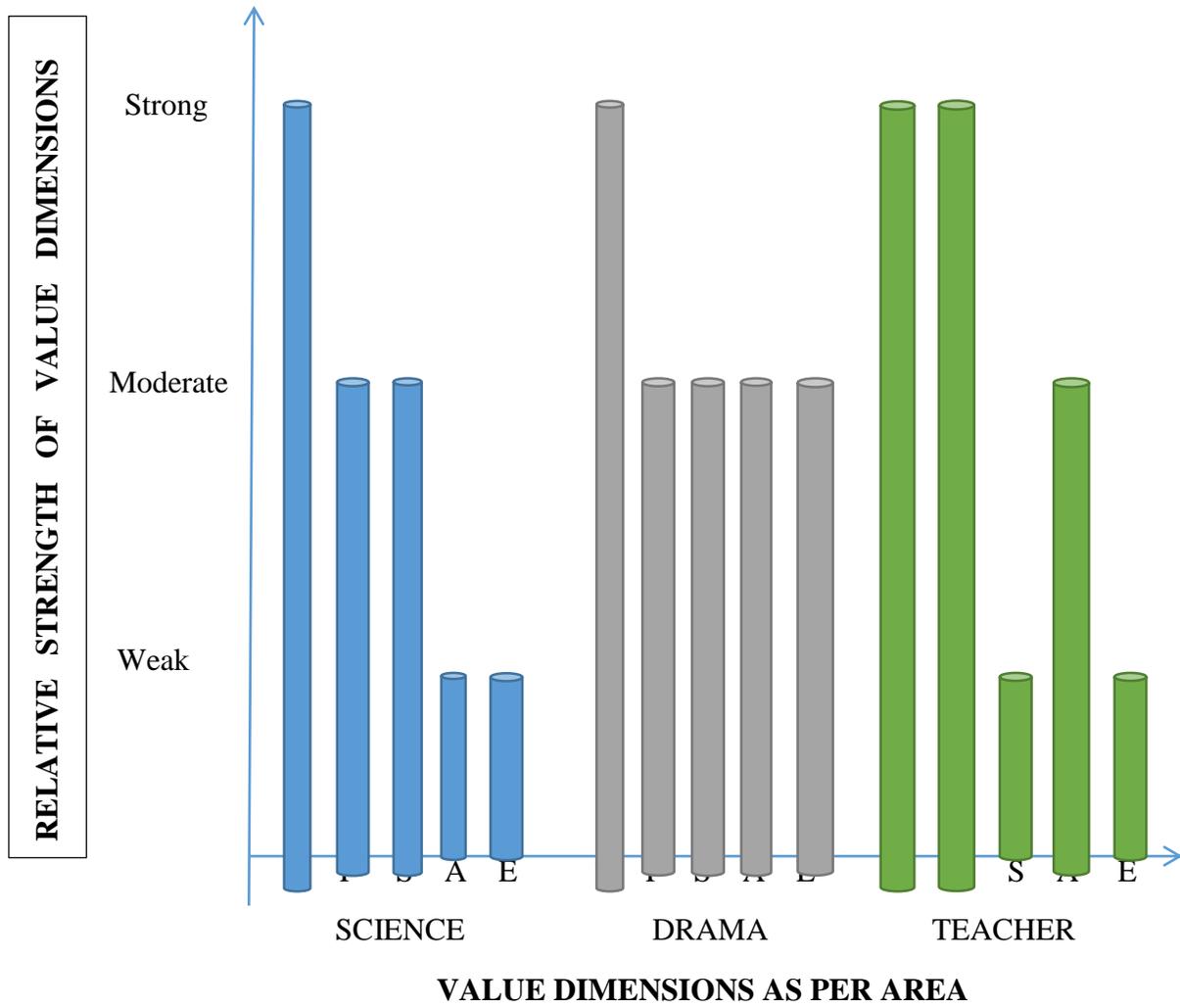
	Technological Valuing	Political Valuing	Scientific Valuing	Aesthetic Valuing	Ethical Valuing
Science	Strong	moderate	moderate	weak	weak
Drama	Strong	moderate	moderate	moderate	moderate
Teacher	Strong	strong	weak	moderate	weak

Figure 28. Summary of Axiological Values in terms of Huebner's, (1975), Framework Held by Teacher and Inherent in Curriculum Documents

	Simple and Certain Knowledge	Justification by Authority	Personal Justification	Other Means of Justification
Science	Strong	Strong	Strong	Weak
Drama	Strong	Strong	Moderate	Moderate
Teacher	Strong	Strong	Strong	Weak

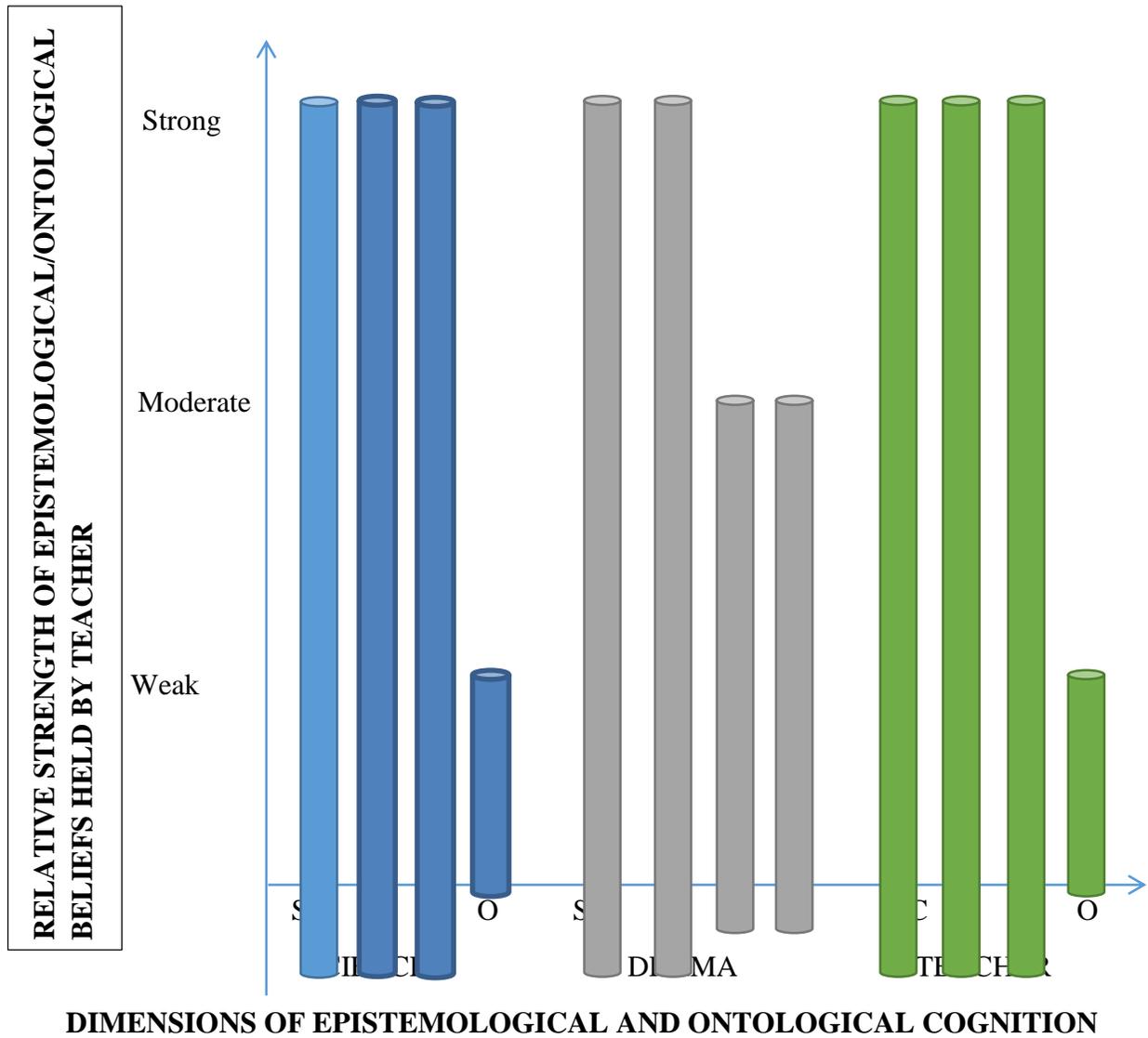
Figure 29. Summary of Epistemological and Ontological Beliefs Held by Teacher and Inherent in Curriculum Documents

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LEGEND : T-technological P-political S-scientific A-aesthetic E-ethical

Figure 30. Shows Relative Strengths of Huebner's, (1975), Dimensions of Axiological Values



LEGEND : S/C-simple and certain knowledge A-justification by authority
 P- personal justification O-other means of justification

Figure 31. Shows Relative Strengths of Epistemological and Ontological Beliefs

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Based on the comparison of the beliefs apparently held by the teacher who is currently enacting the CAC drama and science curricula and the beliefs implied in the curricula, there seems to be fairly good compatibility between the two in terms of Rogers, (2003), Diffusion of Innovation Theory. Rogers, (2003), explains that compatibility which he defines as ‘the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters,’(p.27), is one of his four postulated qualities of a curriculum innovation that will facilitate the adoption of the curriculum by a social system, that is , the teacher in this case. According to Fullan, (2007), complexity is the perceived difficulty, the extent of skills required, the degree of alteration of teacher beliefs and the extent of changes in teaching strategies and materials needed to effectively implement a new curriculum policy (p.104). The fairly good correlation between the teacher’s existing beliefs which has been determined to be Realist in terms of Greene et al., (2008,2010) model and those realist beliefs inherent in the curriculum will further facilitate the successful implementation. In terms of Coburn, (2003), concepts of ‘Depth’ and ‘Spread’ which involve alteration of beliefs within those enacting the curriculum and the spreading of the beliefs inherent in the curriculum itself respectively, there cannot be any positive conclusions since this teacher has been implementing CAC for the past two years and there was no pre-assessment of his beliefs. Therefore the currently ascertained similarity in beliefs between this teacher and the beliefs implied in the CAC curriculum documents cannot be described as alterations in the beliefs of the teacher as the data in this study cannot be used to ascertain any changes in beliefs.

Recommendations

Based on the findings recorded, the methodology used and the conceptual framework that informed this research study, the following recommendations are being made :

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- 1) The scientific, ethical and aesthetic dimensions of axiological values need to be further developed in the area of science to bring balance to the subject area. This can only be done at the level of the school.
- 2) There is a need to explore, at the level of the school, other areas of Rogers, (2003), and Fullan's, (2007), dimensions of successful curriculum implementation to determine areas of weakness in the curriculum diffusion and implementation processes. This issue came to the fore during the interview process with the teacher's reference to self-efficacy beliefs and Ministry of Education support of the implementation process
- 3) There is a need to explore other means of justification as a basis of learning in the primary classroom to ascertain its value in the elementary educative process
- 4) Further action research involving classroom observations are necessary to determine whether the teacher's axiological beliefs in the scientific, aesthetic and ethical dimensions need to be developed for greater classroom effectiveness
- 5) With respect to the research study itself, a prolonged period of classroom observations was necessary to improve the validity of the data with respect to the teacher's beliefs
- 6) At least two other participants experiencing different levels of success in the CAC implementation process should have been included in this research. It would have brought much more useful data to be analyzed and allow for cross-case analysis
- 7) The interview process needs to be piloted in order to give the interviewer a greater understanding of what areas need to be deeply explored in order to access deeply held information relevant to the study and also to understand the process of identifying metaphorical language used by the interviewee and getting him to deconstruct it so that it is not subjected to the researcher's interpretation

Conclusion

This study served to show that there is a fairly good correlation between the epistemological, ontological and axiological beliefs held by a teacher currently implementing the CAC Science and Drama Curriculum and the beliefs inherent in the curriculum itself. This situation has probably augured well for the implementation process in this teacher's classroom since similarity of beliefs has been shown to be a major facilitator of successful implementation. However, the study has also uncovered what might be termed 'weaknesses' in the value system of the teacher and the curriculum and can be used as a launching pad for other research possibilities aimed at improving the performance and success of pupils.

REFERENCES

- Beck, Judy, Czerniak, Charlene, M., & Lumpe, Andrew, T. (2000). An Exploratory Study of Teachers' Beliefs Regarding the Implementation of Constructivism in their Classrooms. *Journal of Science Teacher Education*. 11 (4), 323-343.
- Bonner, S.P. (2001). *Science teachers' pedagogical knowledge, educational beliefs, and perceptions of the curriculum on implementation and science reform* (Doctoral Dissertation). Available from ProQuest Dissertations and Thesis database. (UMI No. 3038035).
- Charalambous, C.Y. & Phillipou, G.N. (2010). Teacher Concerns and Efficacy Beliefs about Implementing Curriculum Reform : Integrating Two Lines of Inquiry. *Educational Studies in Mathematics*, 75 (1), 1-21.
- Coburn, Cynthia E. (2003). Rethinking Scale: Moving beyond Numbers to Deep and Lasting Change. *Educational Researcher*. 32 (6), 3-12.
- Creswell, J.W. (2007). *Qualitative Inquiry Research Design. Choosing Among the five Approaches*. SAGE : California.
- Cronin-Jones, Linda L. (1991). Science Teacher Beliefs and their Influence on Curriculum Implementation : Two Case Studies. *Journal of Research in Science Teaching*. 28 (3), 235-250.

EXPLORING CAC BELIEFS

- Donald, J. (1990). University professors' Views of Knowledge and Validation Process. *Journal of Educational Psychology*, 82 (2), 242-249.
- Eisenhart, M.A., Alexander, M.C., Schrum, J.L. & Harding, J.R. (2001). Teacher Beliefs About Their Work Activities : Policy Implications. *Theory Into Practice*. 27 (2), 137-144.
- Feather, N.T. (1995). Values, Valences and Choice : The Influence of Values on the perceived Attractiveness and Choice of Alternatives. *Journal of personality and Social Psychology*. 68 (6), 1135-1151.
- Fernandez, G.W. (2009). Epistemological Beliefs and Teacher Efficacy. Available from ProQuest Dissertations and Theses Database (UMI No. 3446765).
- Fullan, Michael (2007). *The New Meaning of Educational Change* (4th ed.). Teachers College Press : New York.
- Goncalves, Teresa N.R., Azevedo, N.R., Alves, M.G. (2013). Teacher Beliefs About Teaching and Learning: An Exploratory Study. *Educational Researcher*, 2 (1) 54-70.
- Greene, J.A., Azevedo, R. & Torney-Purta, J. (2008). Modeling Epistemic and Ontological Cognition: Philosophical Perspectives and Methodological Directions. *Educational Psychologist*, 43 (3), 142-160.
- Greene, J.A., Azevedo, R. & Torney-Purta, J. (2010). Empirical Evidence Regarding Relations Among a Model of Epistemic and Ontological Cognition, Academic Performance, and Educational Level. *Journal of Educational Psychology*, 102 (1), 234-255.

EXPLORING CAC BELIEFS

Guerra, Patricia, L. & Nelson, Sarah W. (2009). Changing Professional Practice Requires

Changing Beliefs. *Phi Delta Kappan*, 90 (5), 354-9.

Haney, Jody J., Czerniak, Charlene M. & Lumpe, Andrew T. (1996). Teacher Beliefs and

Intentions Regarding the Implementation of Science Education Reform Strands. *Journal of Research in Science Teaching*, 33 (9), 971-993.

Haney, Jodi J., Lumpe, Andrew T., Czerniak, Charlene M. & Egan, Vicki (2002). From Beliefs

to Actions: The Beliefs and Actions of Teachers Implementing Change. *Journal of Science Teacher Education*, 13 (3), 171-187.

Huebner, D. (1975). Curricular Language and Classroom Language. In W.Pinar (Ed.),

Curriculum Theorizing: The Reconceptualists pp. 217-236. Berkeley, California :
McCutchan Publishing Corporation.

Hyde, Arthur A. (1987). Theory Used in Ethnographic Educational Evaluations : Negotiating

Values. *Anthropology and Educational Quarterly*, 18 (3), 131-148. Available at
<http://www.jstor.org/>.

Hussain, S., Mobeen, S. & Saceed, S. (2011). An Investigation into the Philosophic

Views of Secondary Level School Teachers about Education in the Pakistan Context.
Interdisciplinary Journal of Contemporary Research in Business, 3 (2), 1921-1930.

EXPLORING CAC BELIEFS

- Ladd, Patricia S. (1995). An axiological Study of the Spady Model of Outcome – Based Education. Available from ProQuest Dissertations and Theses Database (UMI No. 9525420).
- Lemke, J.L. (1990). Talking Science : Language, Learning and Values. Ablex : New Jersey.
- Lemke, J. (2012). Analyzing Verbal Data: principles, Methods, and Problems. In B.J. Fraser, K. Tobin & C.J. Mc Robbie (Eds.), Second International Handbook of Science Education (pp. 1471-1484). Netherlands: Springer. Retrieved from: <http://www.jaylemke.com>.
- Levin, T. & Nevo, Y. (2009). Exploring teachers' Views on Learning and Teaching in the Context of a Trans-Disciplinary Curriculum. *Journal of Curriculum Studies*. 41 (4), 439-465.
- Lingard, Bob (1996). Educational Policy Making in a Postmodern State. On Stephen J. Ball's Education Reform : A Critical and Post-Structural Approach. *Australian Educational Researcher*, 23 (1) 65-91.
- Looney, Anne (2001). Curriculum as Policy: Some Implications of Contemporary Policy Studies for the Analysis of Curriculum Policy, with Particular Reference To Post Primary Curriculum Policy in The Republic Of Ireland. *The Curriculum Journal*, 12 (2) 149-162.
- Markic, S., Abu-Hola, I. & Eilks, I. (2011). Jordanian Prospective and Experienced Chemistry Teachers' Beliefs about Teaching and Learning and their Potential Role for Educational Reform. *Science Education International*. 22 (3), 185-201.

EXPLORING CAC BELIEFS

Ministry of Education, Curriculum Development Division. (2014). Continuous Assessment Component (CAC) of the Secondary Entrance Assessment (SEA) Science Project 2014-2015 Teachers' Instruction Guide.

Olafson, L., Schraw, G. & Vander Velt, M. (2010). Consistency and development of teachers' epistemological and ontological worldviews. *Learning Environ Res.* 13, 243-266.

Pajares, F.M. (1992). Teachers Beliefs and Educational Research : Cleaning up a Messy Construct. *Review of Educational Research*, 63 (3), 307-332.

Prawat, Richard S. (1992). Teachers' Beliefs About Teaching and Learning : A Constructivist Perspective. *American Journal of Education*, 100 (3), 354-395.

Republic of Trinidad and Tobago, Ministry of Education. (2014). Continuous Assessment Component 2014-2015 Drama Assessment Guide.

Republic of Trinidad and Tobago, Ministry of Education. (2014). Continuous Assessment Component of the Secondary Entrance Assessment Teachers' Manual Drama.

Republic Of Trinidad and Tobago, Ministry of Education. (2014). Continuous Assessment Component of the Secondary Entrance Assessment Teachers' Manual Science.

Republic of Trinidad and Tobago, Ministry of Education. (2014). My Drama Journal Continuous Assessment Component for SEA 2015 Standard 5.

- Roehrig, Gillian H. & Kruse, Rebecca A. (2005). The Role of Teachers' Beliefs and Knowledge in the Adoption of a Reform Based Curriculum. *School Science and Mathematics*, 105 (8),
- Rogers, E. (2003). *Diffusion of Innovations* (5th ed.). Free Press : New York.
- Savasci-Acikalin, Funda (2009). Teacher Beliefs and Practice in Science Education. *Asia-Pacific Forum on Science Learning and Teaching*. 10 (1), 1-14.
- Schraw, G. (2013). Conceptual integration and measurement of epistemological and ontological beliefs in educational research. *ISRN Education*. 13, Article ID 327680. Retrieved from : <http://dx.doi.org/10.1.1155/2013/327680>.
- Schraw, Gregory J. & Olafson, Lori J. (2008). Assessing Teachers' Epistemological and Ontological Worldviews. In M.S.Khine (Ed.), *Knowing, knowledge and Beliefs: Epistemological Studies Across Diverse Cultures* (pp. 25-44). Las Vegas:Springer.
- Smith, Kenneth E. (1993). Development of the primary Teacher Questionnaire. *Journal of Educational Research*. 87 (1), 23-31.
- Shepard, Lorie A. (1991). Psychometricians' Beliefs About Learning. *Educational Researcher*, 20 (7) 2-16.

EXPLORING CAC BELIEFS

Slotta, James D. & Chi, Michelene T.H. (2006). Helping Students Understand Challenging

Topics in Science through Ontology Training. *Cognition and Instruction*, 24 (2),

261-289.

Smith, Kenneth. (1993). Development of the Primary teacher Questionnaire. *Journal of*

Educational Research, 87 (1) 23-30.

Stiggins, R. (2005). From Formative assessment to Assessment for Learning : A Path to Success

in Standards Based Schools. *Phi Delta Kappan*, 87 (4), 324-328.

Wallace, C.S. & Priestley, M. (2011). Teacher Beliefs and the Mediation of Curriculum

Innovations in Scotland : A Socio-Cultural Perspective on Professional Development and

Change. *Journal of Curriculum Studies*, 43 (3), 357-381.

Yin, Robert K. (2009). *Case study research : Design and Methods (4th ed.)*. Sage : California.

APPENDICES

Appendix 1

The Epistemic and Ontological Cognition Questionnaire (Greene et al., 2008, 2010)

This questionnaire was adapted for use in the well-structured domain, science and the ill-structured domain, drama education, of the CAC.

Answer all questions as truthfully as you can by circling the number that BEST represents your position.

1- completely disagree 2 – mostly disagree 3 – somewhat disagree 4 – somewhat agree

5 – mostly agree 6 – completely agree

1. In Science, the truth means different things to different people.

1 2 3 4 5 6

2. To know science well, you need to memorize what you are taught.

1 2 3 4 5 6

3. In science, what is a fact today will be a fact tomorrow.

1 2 3 4 5 6

4. Scientists/researchers knowledge of the facts about science does not change.

1 2 3 4 5 6

5. Science is so complex that humans will never really understand it.

1 2 3 4 5 6

6. If a scientist says something is a fact, I believe it.

1 2 3 4 5 6

7. Things written in science textbooks are true.

1 2 3 4 5 6

EXPLORING CAC BELIEFS

8. I believed everything I learned in science class.

1 2 3 4 5 6

9. If a science teacher says something is a fact, I believe it.

1 2 3 4 5 6

10. In science, everyone's knowledge can be different because there is no one absolutely right answer.

1 2 3 4 5 6

11. In science, if you believe that something is a fact, no one can prove to you that you are wrong.

1 2 3 4 5 6

12. In science, what is a fact depends upon a person's point of view.

1 2 3 4 5 6

13. Science knowledge is all factual and there are no opinions.

1 2 3 4 5 6

14. In Drama, the truth means different things to different people.

1 2 3 4 5 6

15. To know Drama well, you need to memorize what you are taught.

1 2 3 4 5 6

16. In Drama, what is a fact today will be a fact tomorrow.

1 2 3 4 5 6

17. Drama educators /educational researchers' knowledge of the facts about drama does not change.

1 2 3 4 5 6

EXPLORING CAC BELIEFS

18. Drama education is so complex that humans will never really understand it.

1 2 3 4 5 6

19. If a drama educator/educational researcher says something is a fact, I believe it.

1 2 3 4 5 6

20. Things written in drama education textbooks are true.

1 2 3 4 5 6

21. I believed everything I learned in drama education class.

1 2 3 4 5 6

22. If a drama education teacher says something is a fact, I believe it.

1 2 3 4 5 6

23. In drama education, everyone's knowledge can be different because there is no one absolutely right answer.

1 2 3 4 5 6

24. In drama education, if you believe that something is a fact, no one can prove to you that you are wrong.

1 2 3 4 5 6

25. In drama education, what is a fact depends upon a person's point of view.

1 2 3 4 5 6

26. Drama education knowledge is all factual and there are no opinions.

1 2 3 4 5 6

Appendix 2

Interview Questions – Teacher’s Epistemological and Ontological Beliefs

1. Could you please state how long you have been teaching?
2. Could you please state your professional qualifications?
3. What levels have you taught during your career?
4. At what level are you currently teaching and how long have you been implementing the CAC curriculum?
5. Did you receive training in all areas of the CAC curriculum?
6. How successful do you believe you are in the implementation of CAC?
7. How do you feel about your background knowledge in the various areas of the CAC curriculum?
8. What is your personal attitude to the CAC?
9. How do you think students learn?
10. What is your role in the learning process? How do you fit in?
11. What sort of things should students learn about in (a) science and (b) drama education?
12. During lessons, what sorts of interactions do you like to encourage?
13. How do you decide what to teach and what not to teach in your classroom?
14. How do you know when learning is occurring in your classroom?
15. How do you know when your students understand?

Appendix 3

The Axiological Values Interview Questionnaire (Adapted from Ladd, 1995).

This interview protocol was used to evaluate the participant's axiological values in terms of Huebner's, (1966), framework. The first seven questions which are not part of Ladd's original items are designed to collect demographic data.

1. Can you please state your age and gender?
2. How many years' experience do you have as a teacher?
3. How long have you been implementing the CAC?
4. Are you satisfied with the training and preparation you received for implementing the CAC?
5. Are you receiving sufficient support for implementing the CAC from your school/district/Ministry of Education?
6. What was your elective area at Teachers' College Training?
7. What education-related professional qualifications do you have?
8. What is important to you as an educator? What is your most important role?
9. What is the most important thing you teach your students?
10. What seems to be important to the Ministry of Education? Who decides what's important?
11. Describe how you evaluate students learning. What changes have you made in evaluating student over the past five years?
12. What is the Continuous Assessment Component of the Secondary Entrance Assessment?
13. If the choice were yours alone, which, if any, components of CAC would you use in your classroom?

APPENDIX 4

Language indicators of Huebner's Five Value System.

Technological	Political	Scientific	Aesthetic	Ethical
Objective	Control	Learn	Integrated	Role model
Outcome	System	Life long learner	Holistic	Interaction
Sequential	Decide	Study	Balance	Concern
Skills	Power	Discover	Feel	Student
Prepare	Satisfy	Try	Involved	Present
Analyse	Complain	Read	Participate	Human
Content	Complaint	Thought	Critic	Influence
Content area	Have to	Reflect	Critique	Mutual
Work force	Make	Discuss	Complete	Respect
Schedule	Legal	Research	Appreciate	Respond
Grade	Problem	Innovation	Create	Conversation
Report card	Protest	Used to	Discover	Dialogue
Industry	Label	Apply	Explore	Promise
Citizenship	Stigma	Try	Interest	Accept
Expect	Uproar	Idea	Unity	Faith
Knowledge base	Associate	Rethink	Enrich	Potential
Instill	Contract	Questioned	Understand	Confidence
Accountability	Status quo	Wonder	Enjoy	Open
Responsibility	Influence	Change	Appreciate	Honesty
Committee	Policy	Paradigm	Experience	Forgive
Grade level	School board	Training	Love	Self esteem
Groups	Administrator	Realize	Project	Individual
Test	I give (grades)	Autonomy	Satisfaction	Can do
College entrance	Rights	Goal	Freedom	Team work
Requirements	Fight	Evolve	Whole	Faith

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Technological	Political	Scientific	Aesthetic	Ethical
Product	Argue	Improve	Response	Cooperation
Level	Allow	Confirm	Design	Compassion
Credit	Worth	Design	Beauty	Empathy
Rational	Manipulate		Integrity	Caring
Ends			Form	Support

Appendix 5

20th May, 2015

Dear Mr. X,

My name is Mahindranath Maharajh, currently a student at the University of the West Indies, St. Augustine Campus, reading for a Masters Degree in Education. As part of my matriculation requirements, I am currently conducting research with respect to the role and importance of teachers' beliefs in enacting curriculum change.

As you are aware, the recently implemented CAC curriculum innovation is the subject of much discussion and analysis so it is hoped that this research will add, in some positive way, to the many ideas being generated in educational circles and assist us all in better understanding the entire process.

My research design entails the detailed look at a single case of a teacher successfully implementing the CAC. I have already applied for and received the permission of the Ministry of Education and your principal to conduct research at your school and am now seeking your kind consent to conduct my study in your class.

Should you agree to my request, please note that I will require that you complete one simple self-assessment instrument that will take no more than thirty minutes and be interviewed by me which should take approximately two hours and will be audiotaped. Each segment of this data collection will be done at a mutually convenient time.

Most importantly, I want to assure you that every bit of information gathered will be held in the strictest confidence and used for the purposes of research only and your identity and that of

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your school will not be revealed or hinted to in any way. The recordings and field notes will have no information to connect these to you or the school and all identities will remain strictly anonymous. Please note that you can withdraw from study at any time.

Kindly note that if you require a copy of this research paper, you will be furnished one upon request from the author. I thank you sincerely for your very kind consideration of my request and look forward to a positive response at your earliest convenience.

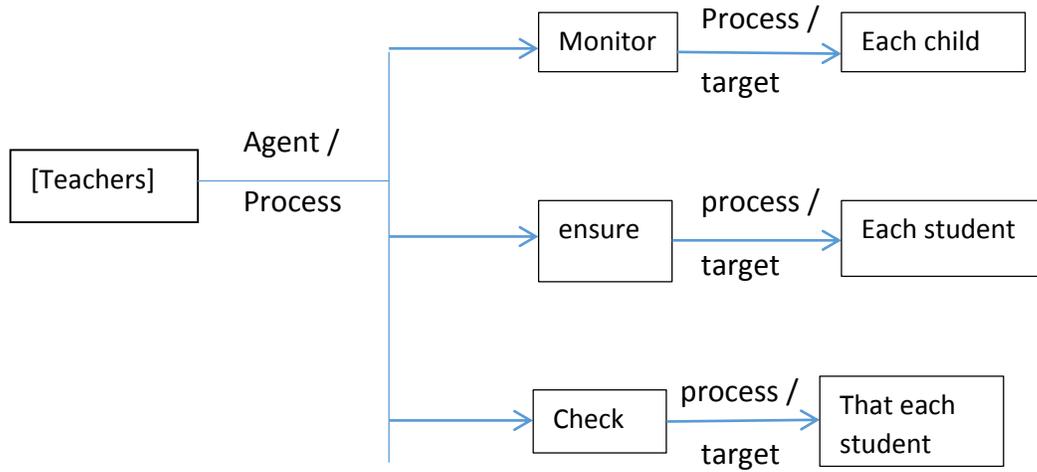
Yours respectfully

Mahindranath Maharajh

University of the West Indies Student I.D. 98733375

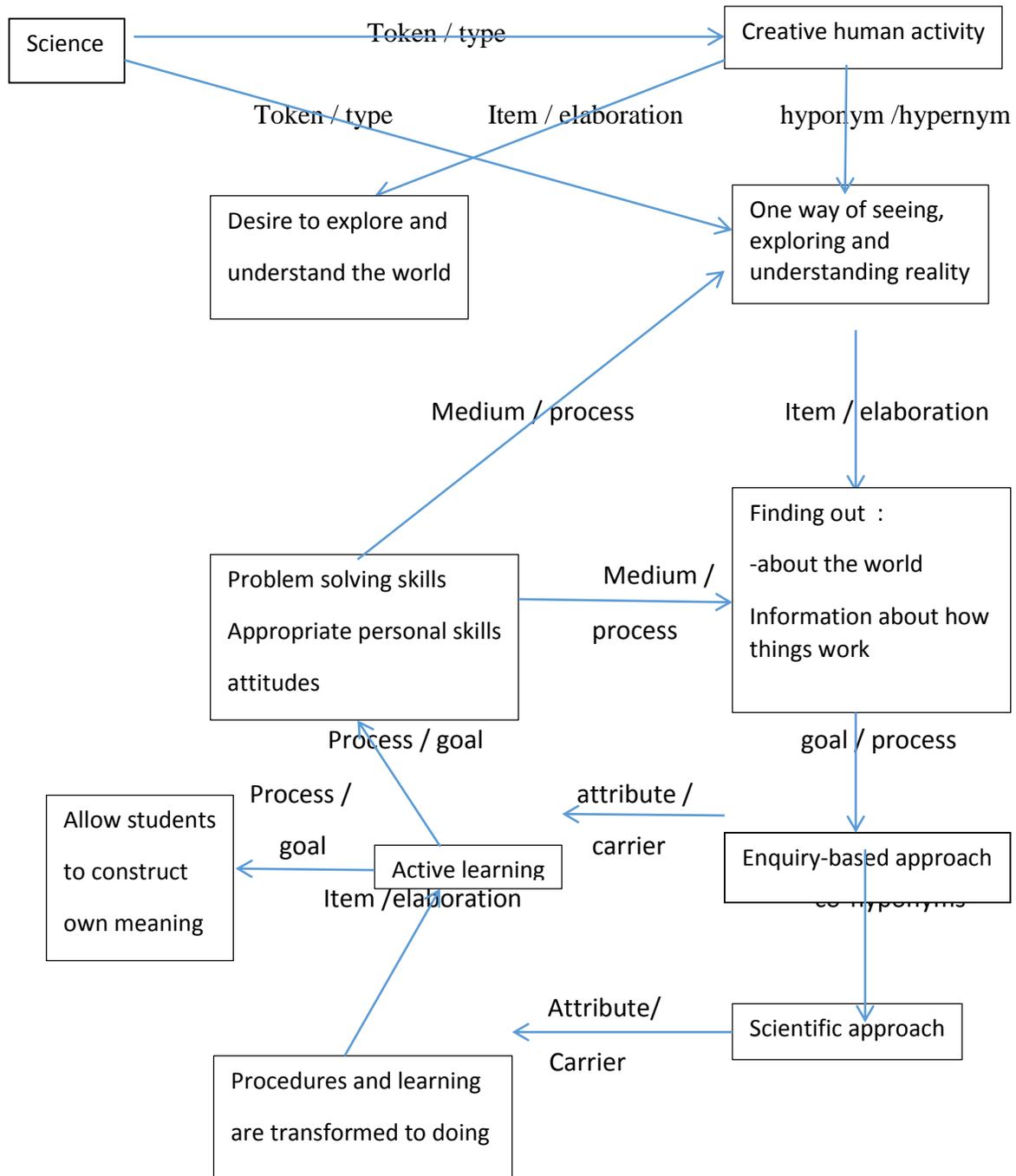
Appendix 6

Thematic Analysis of Section Entitled 'Teachers' Role' on Page 3 of Instruction Guide



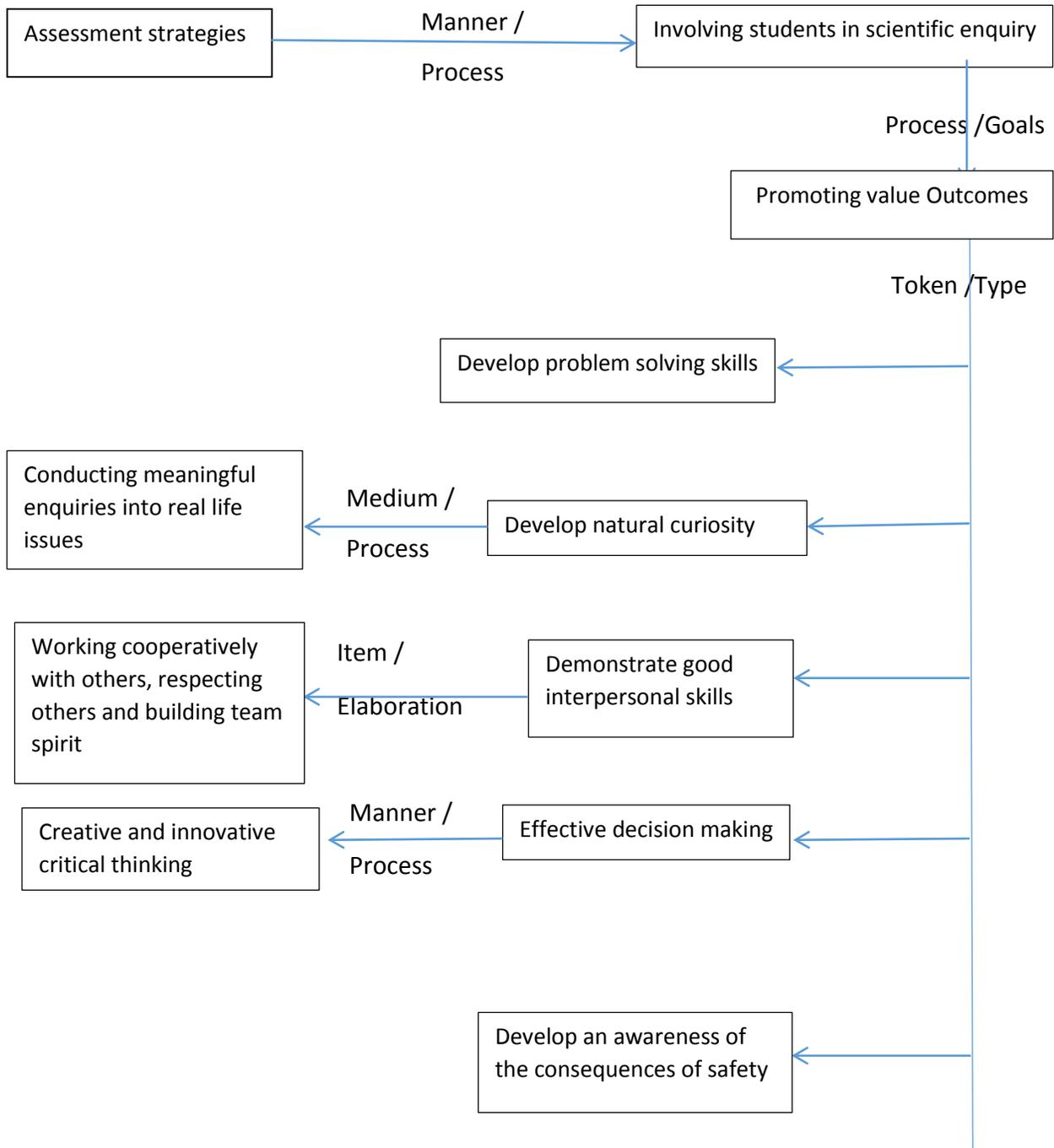
Appendix 7

An analysis of the introduction to the CAC Teachers' Manual for Science



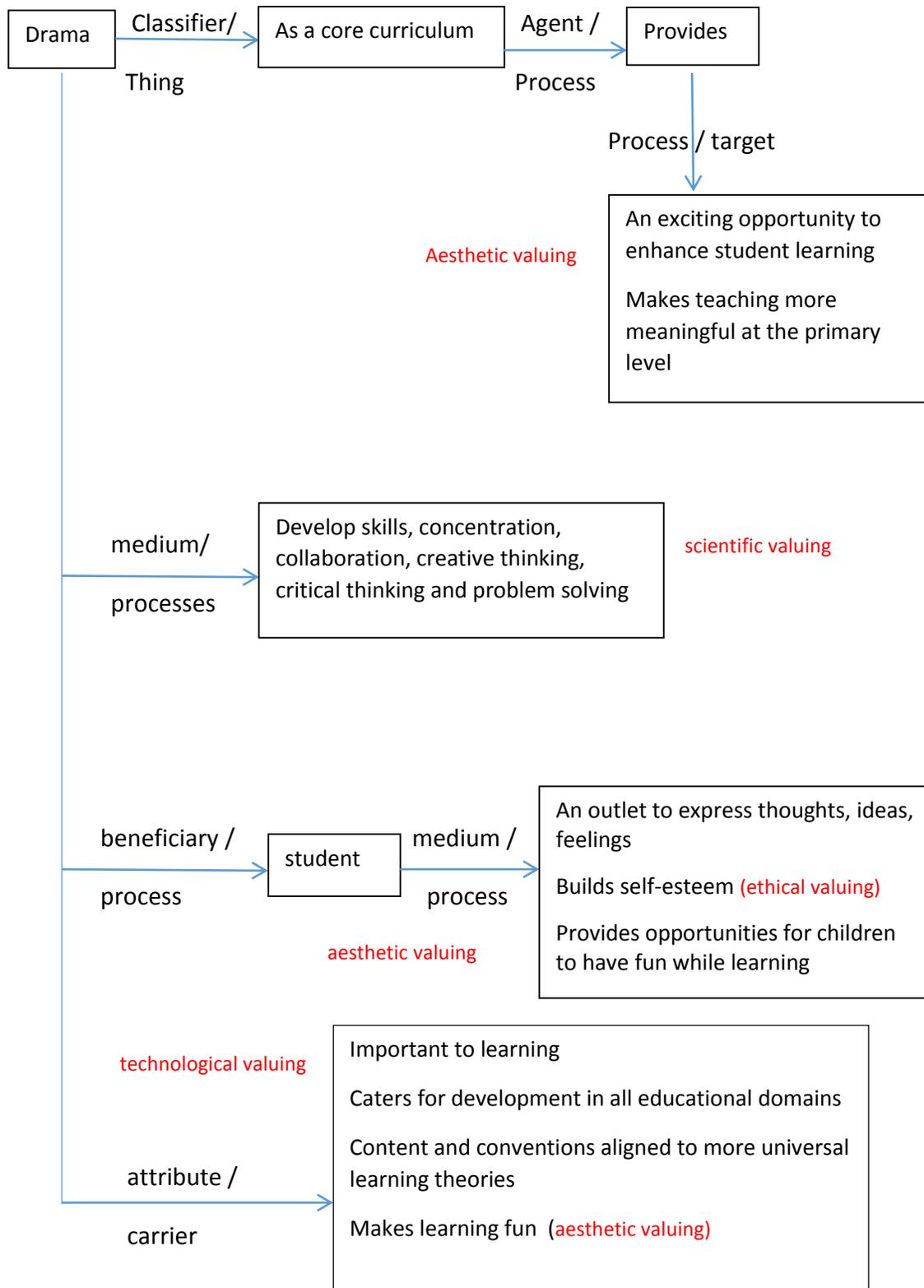
Appendix 8

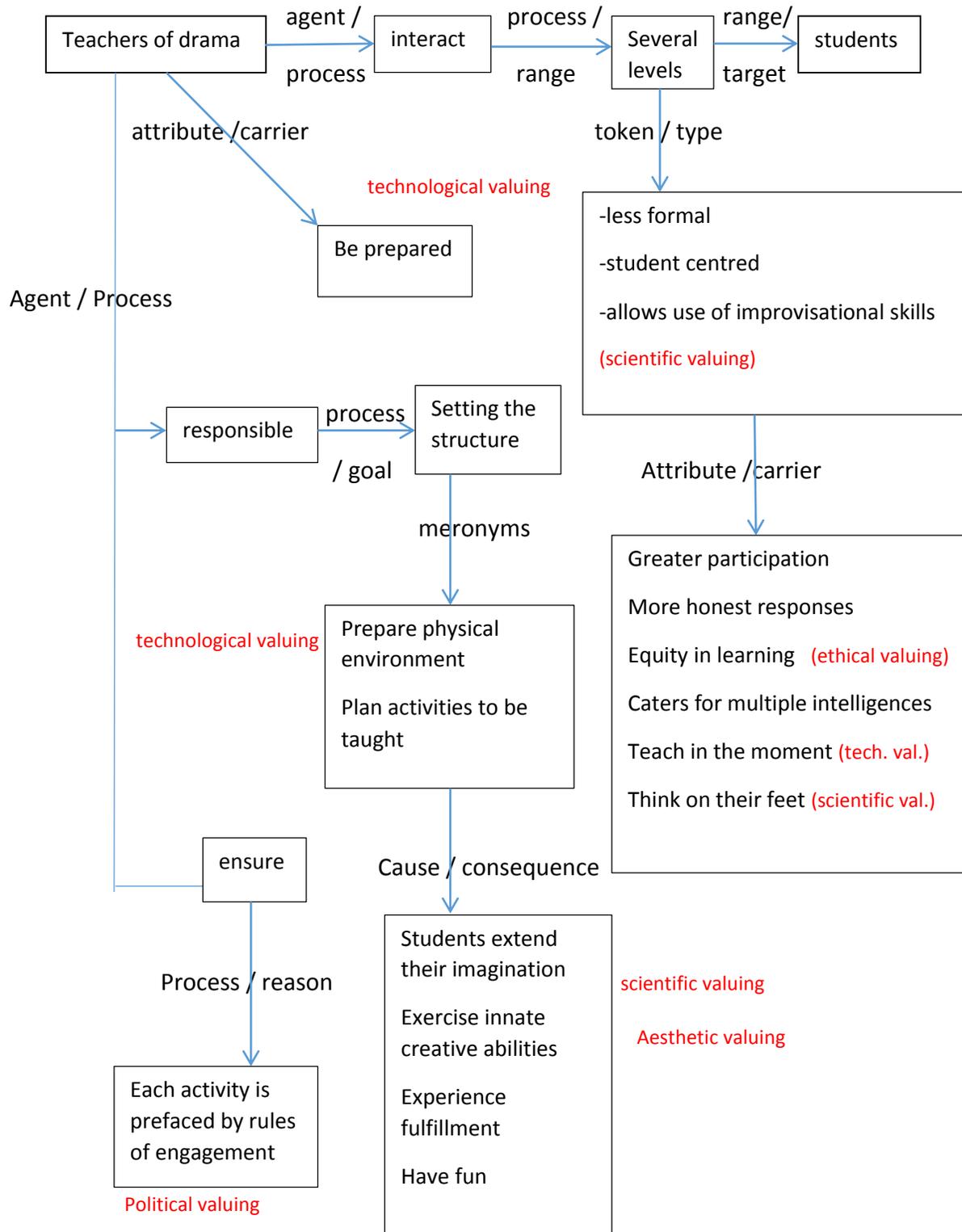
A thematic analysis of the assessment strategies listed in the Teachers' Manual for CAC Science



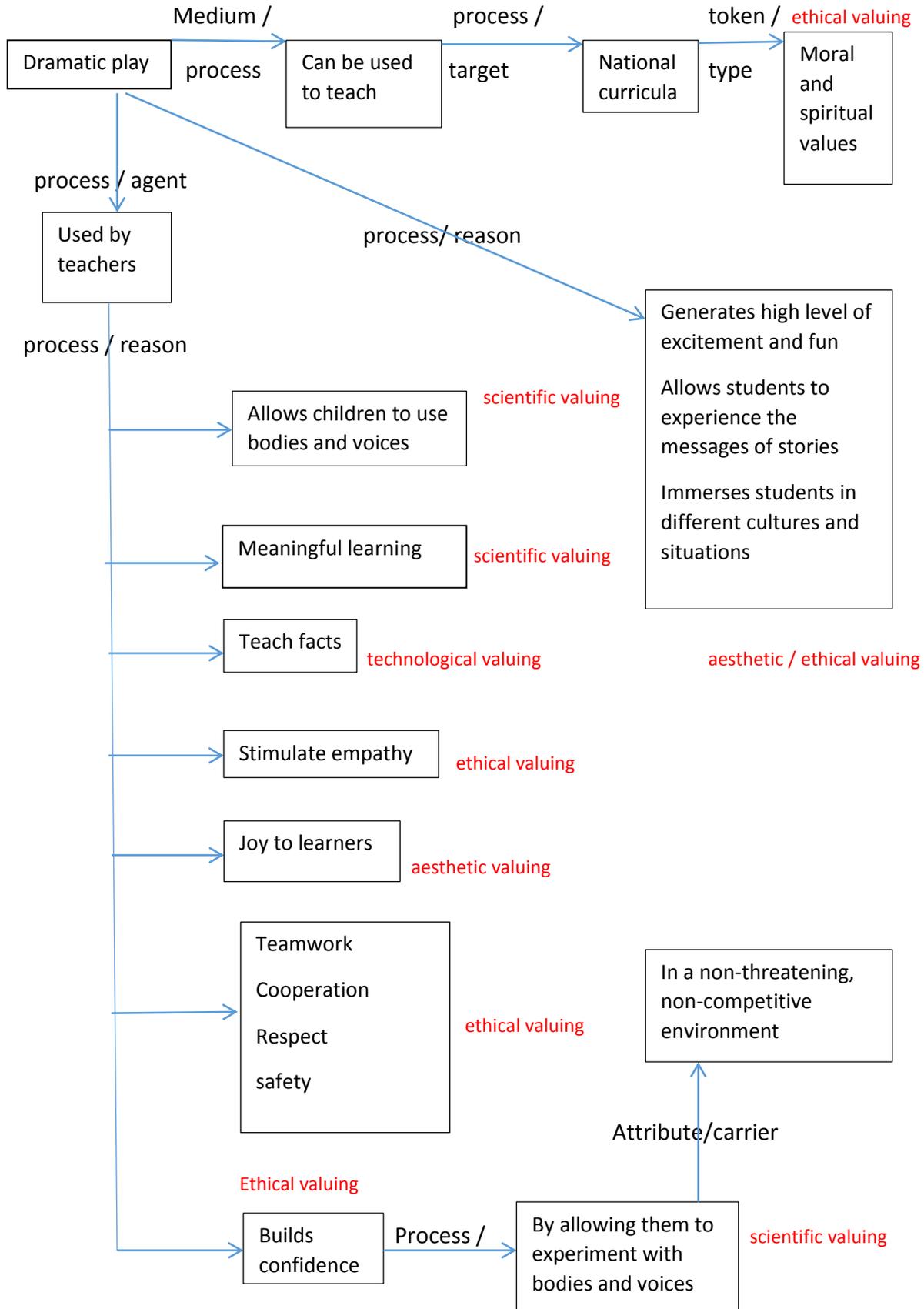
Appendix 9

A Thematic Analysis of the Introduction of the Teachers' Drama Manual

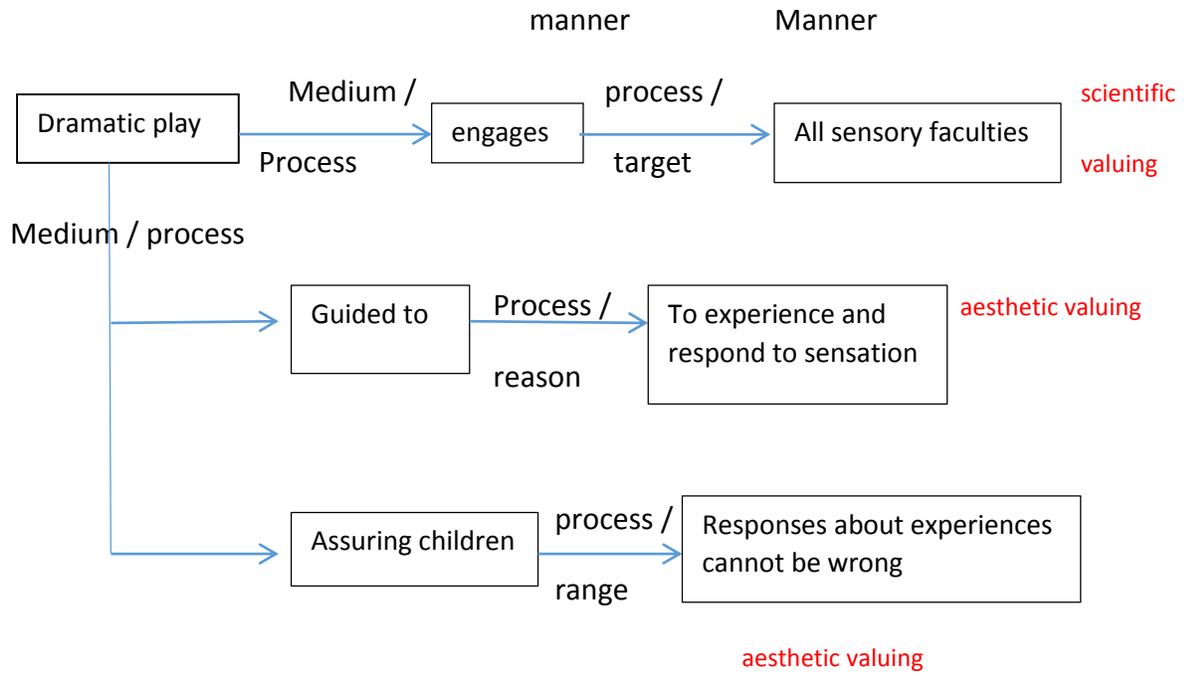




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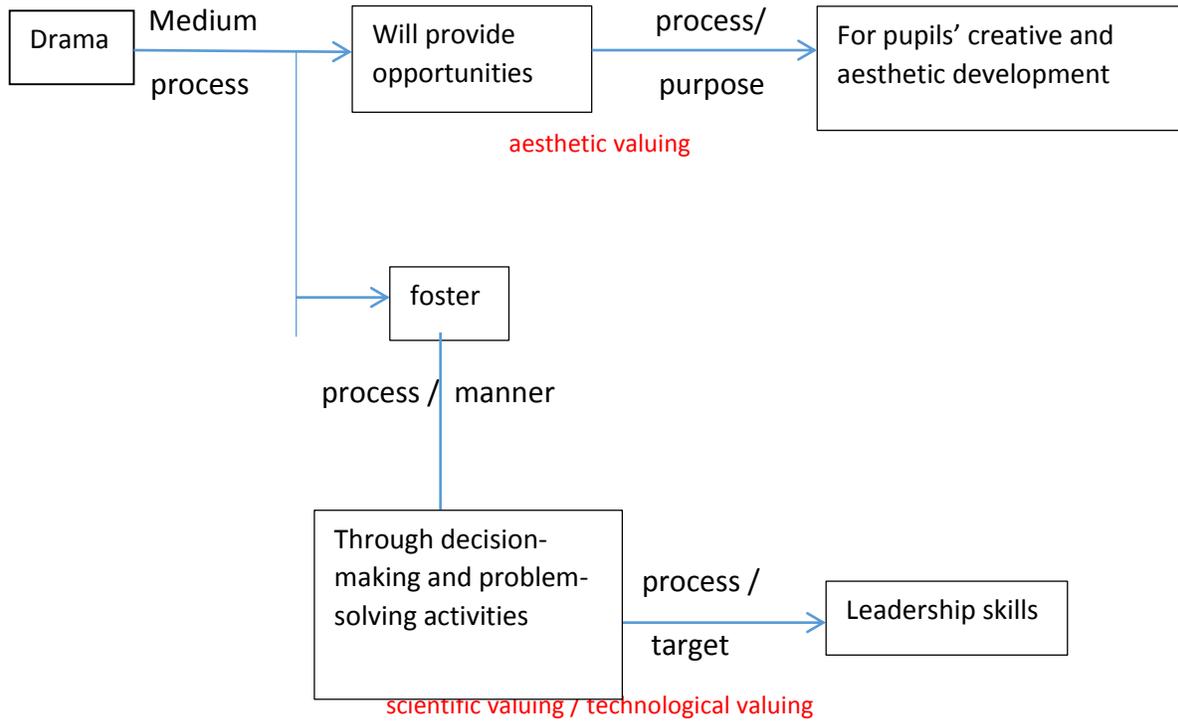
EXPLORING CAC BELIEFS



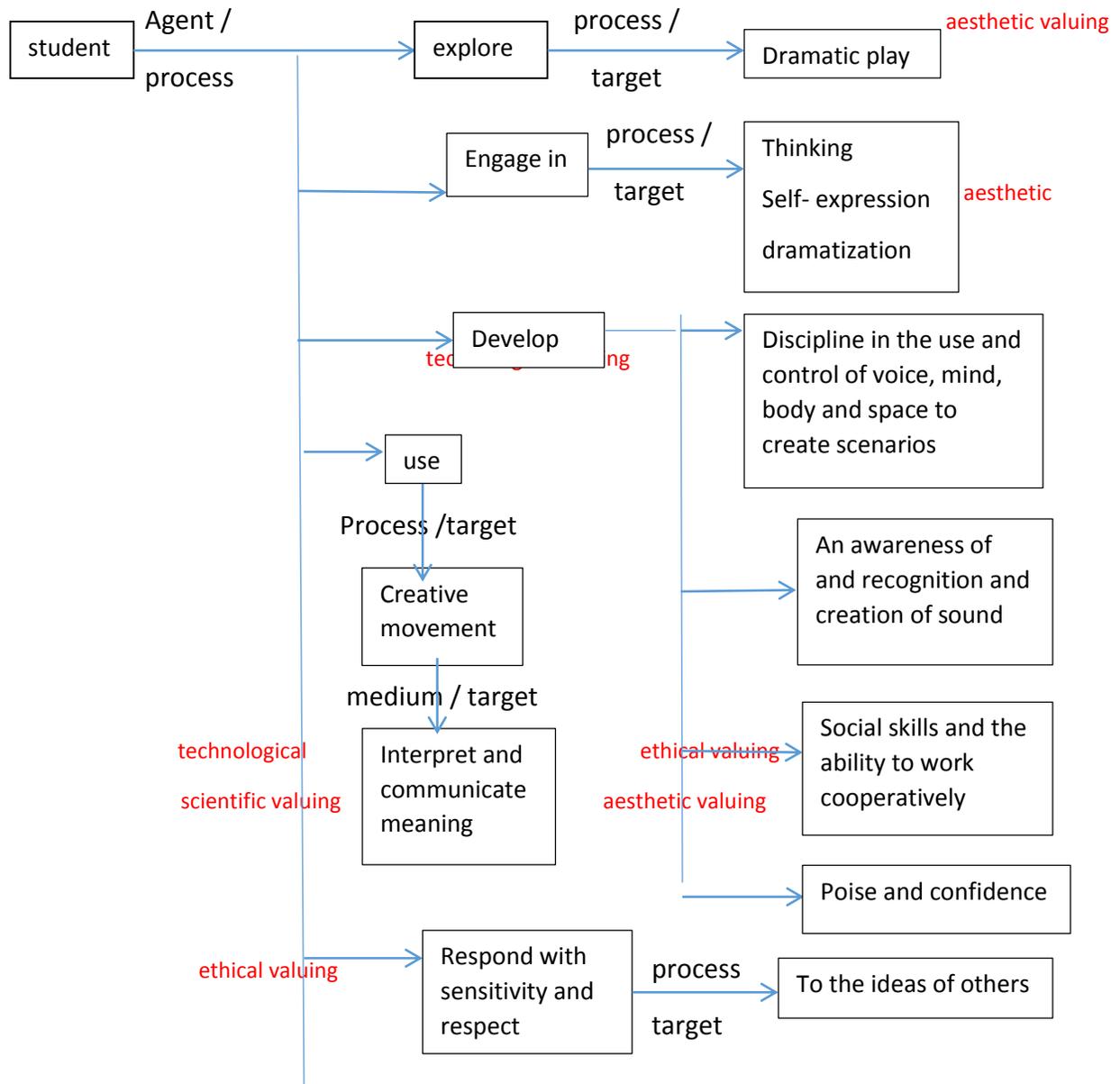
Appendix 10

A Thematic Analysis of the General and Specific Objectives - Teachers' Drama Manual

The General Objectives

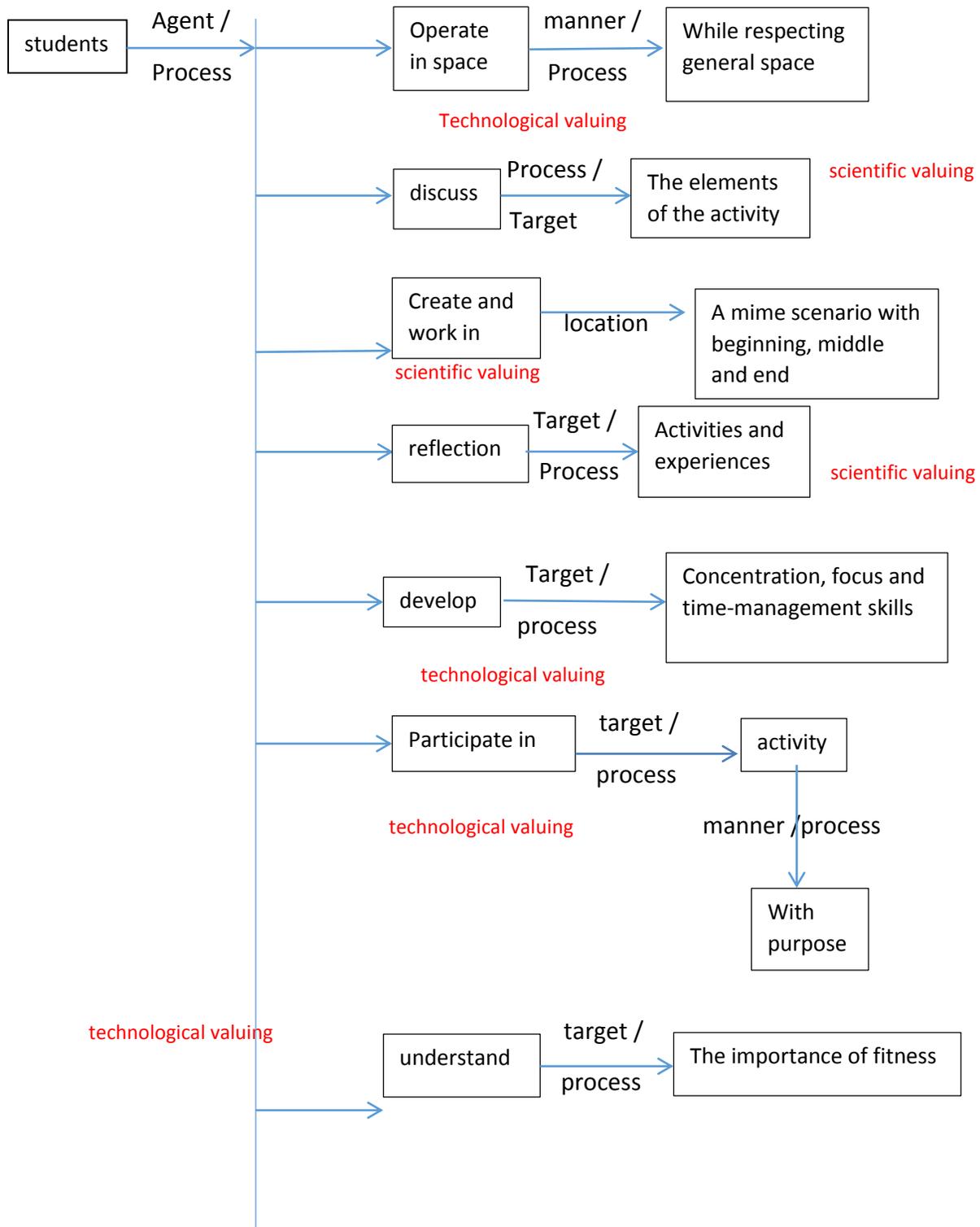


The Specific Objectives



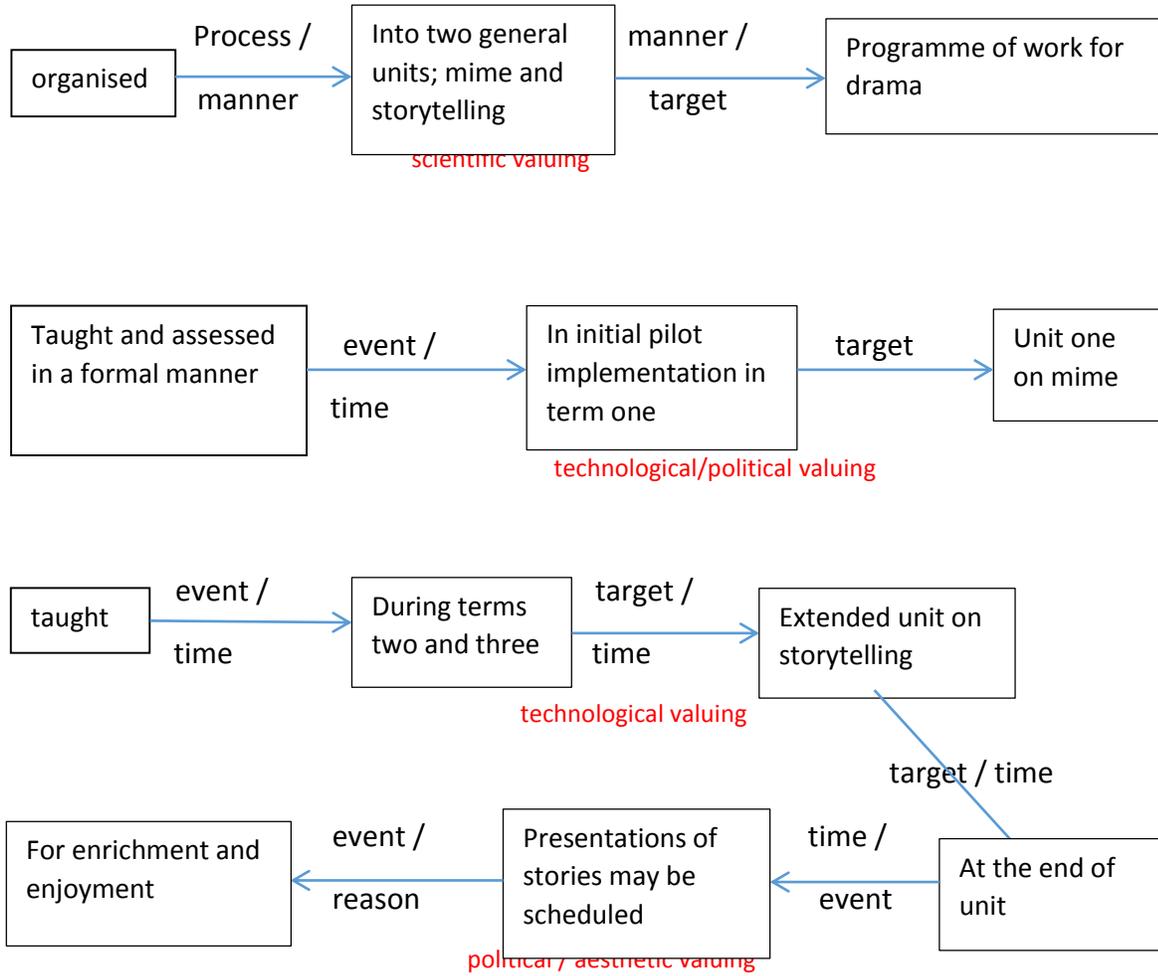
EXPLORING CAC BELIEFS

Specific Objectives continued/

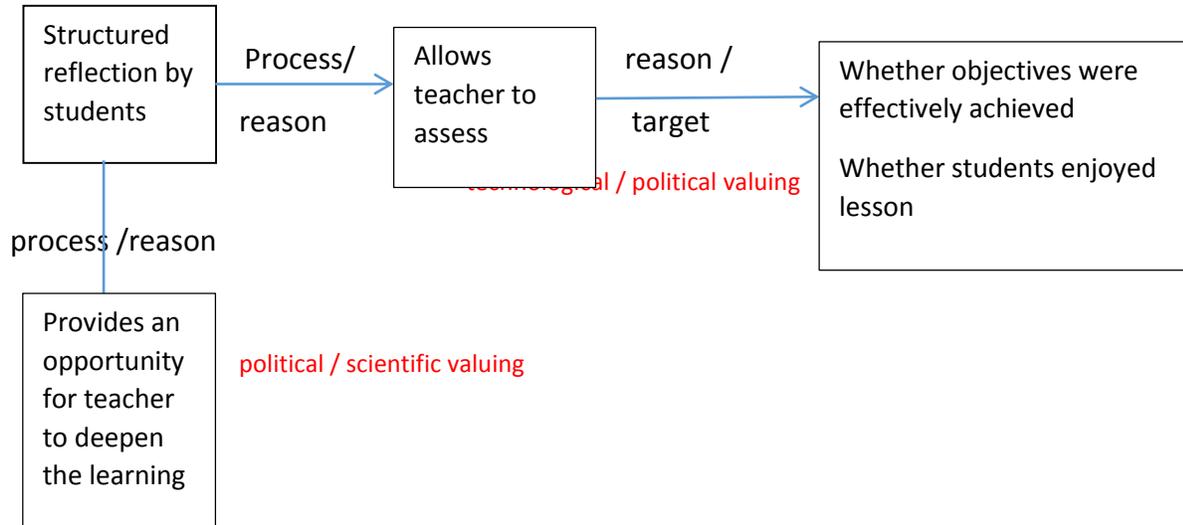


Appendix 11

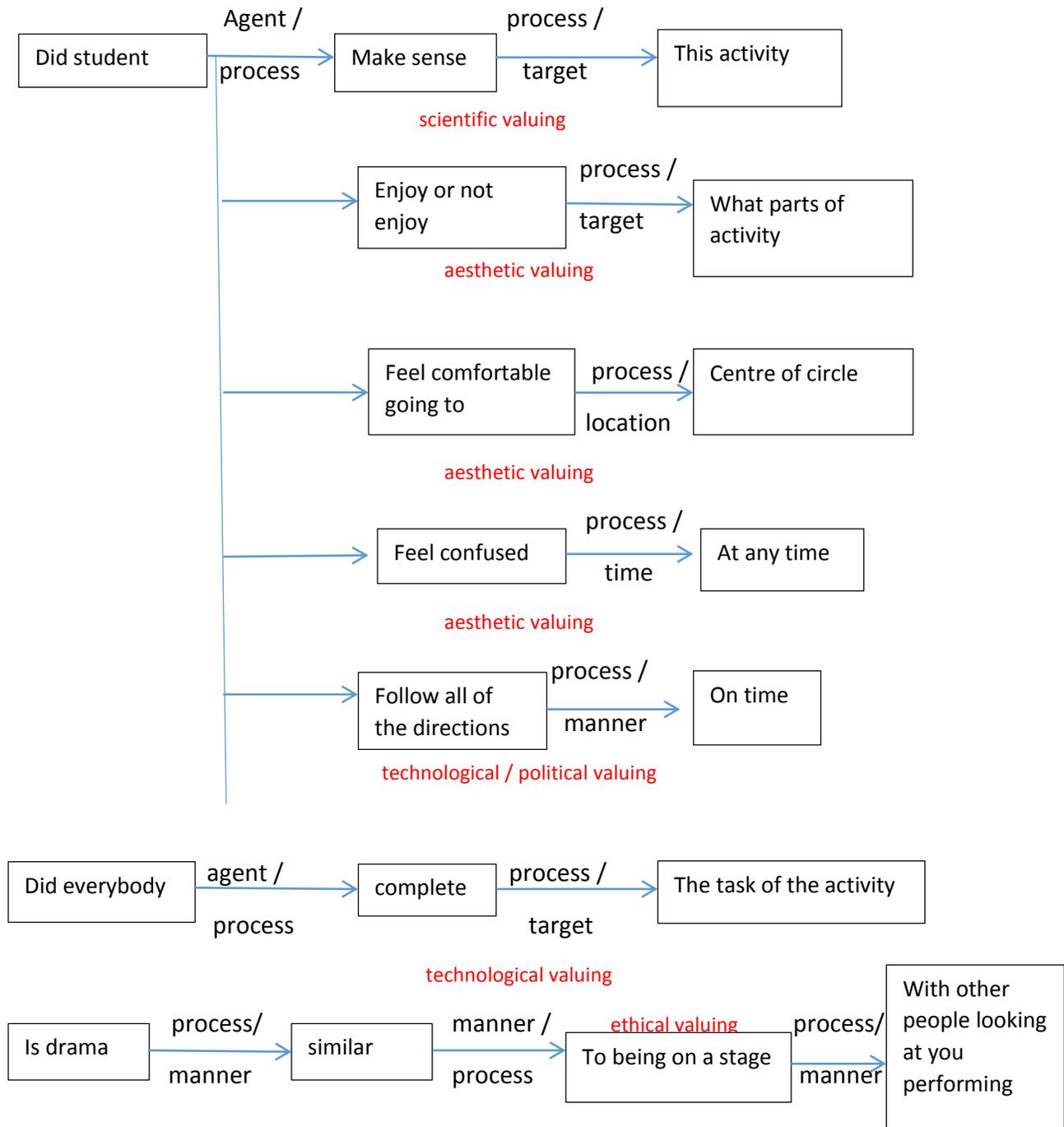
A Thematic Analysis of the Programme of Work-Teachers' Drama Manual



Analysis of Sample Questions for Reflection (pg. 6)



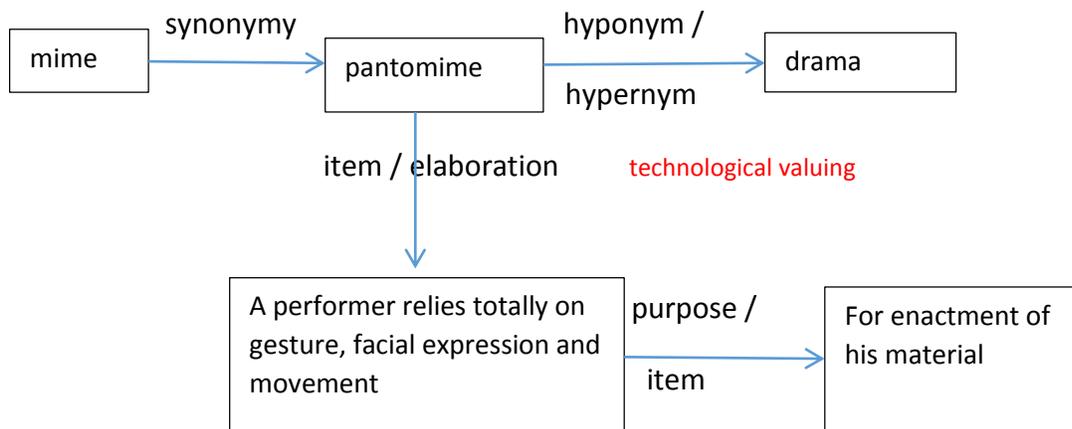
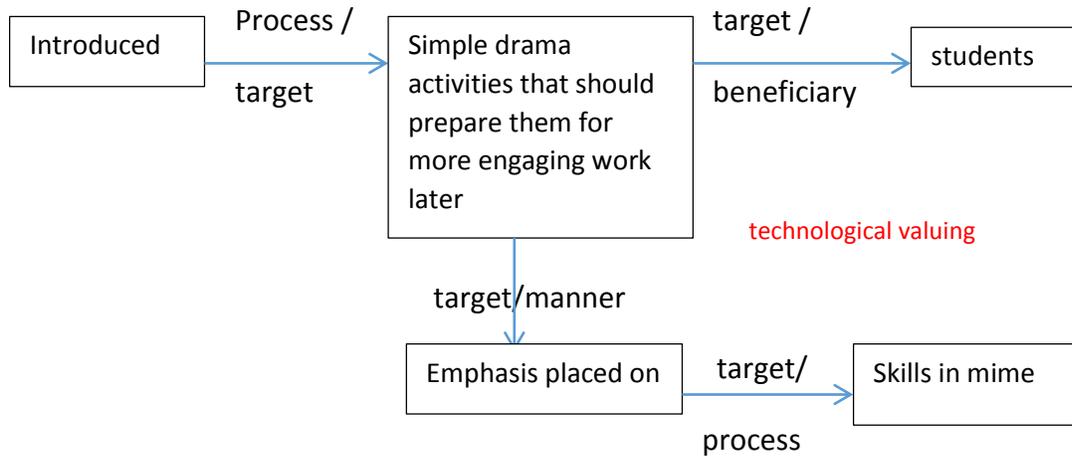
ample Reflection Questions



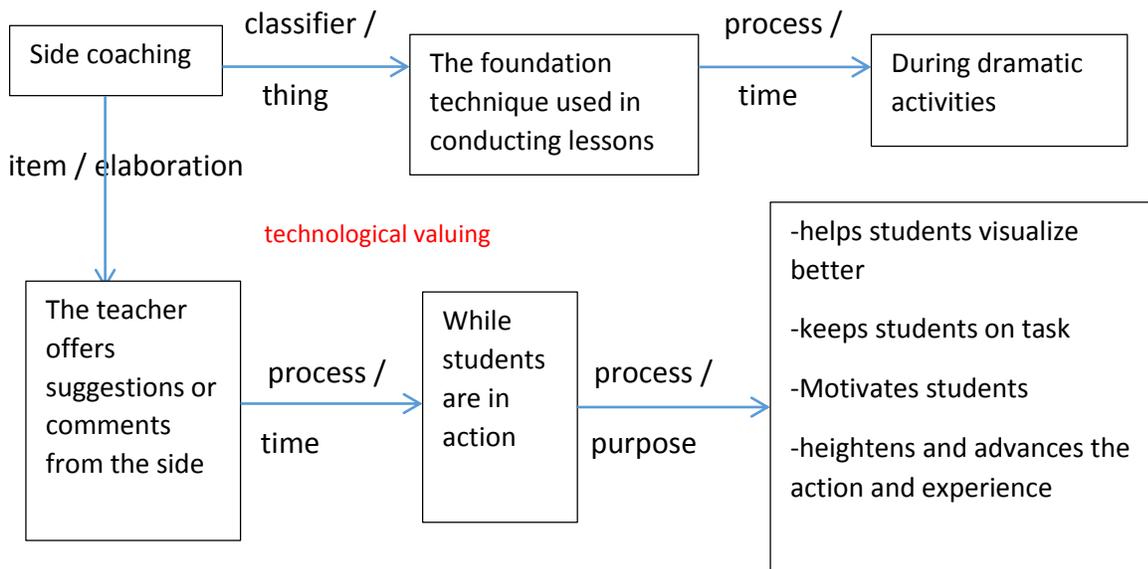
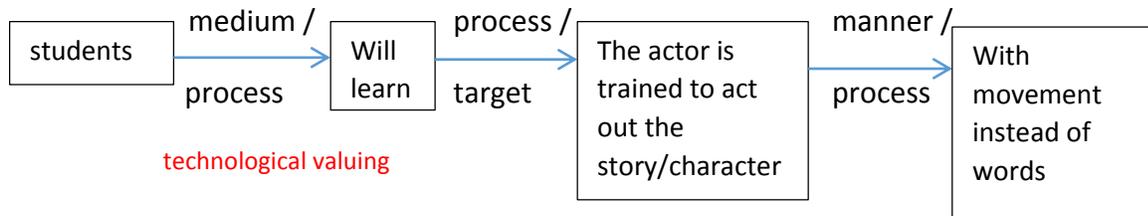
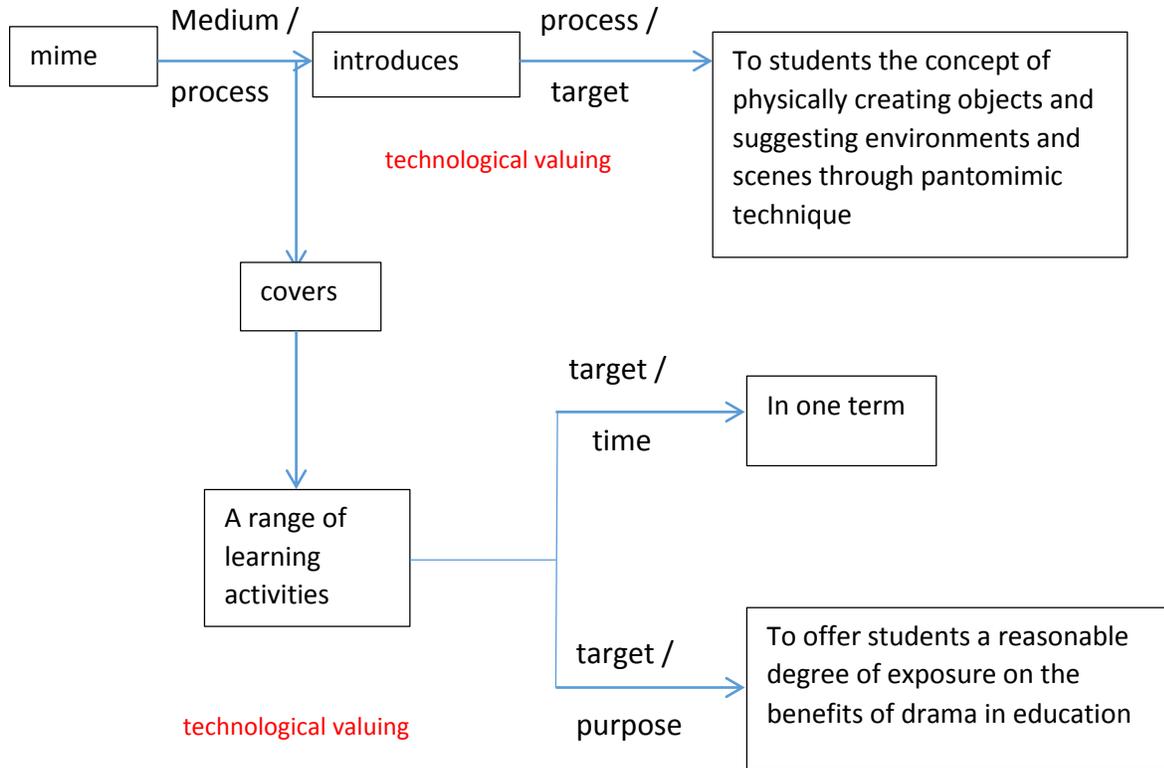
Appendix 12

Thematic Analysis of Programme of Work from the Teachers' Drama Manual-

The Introduction to Mime

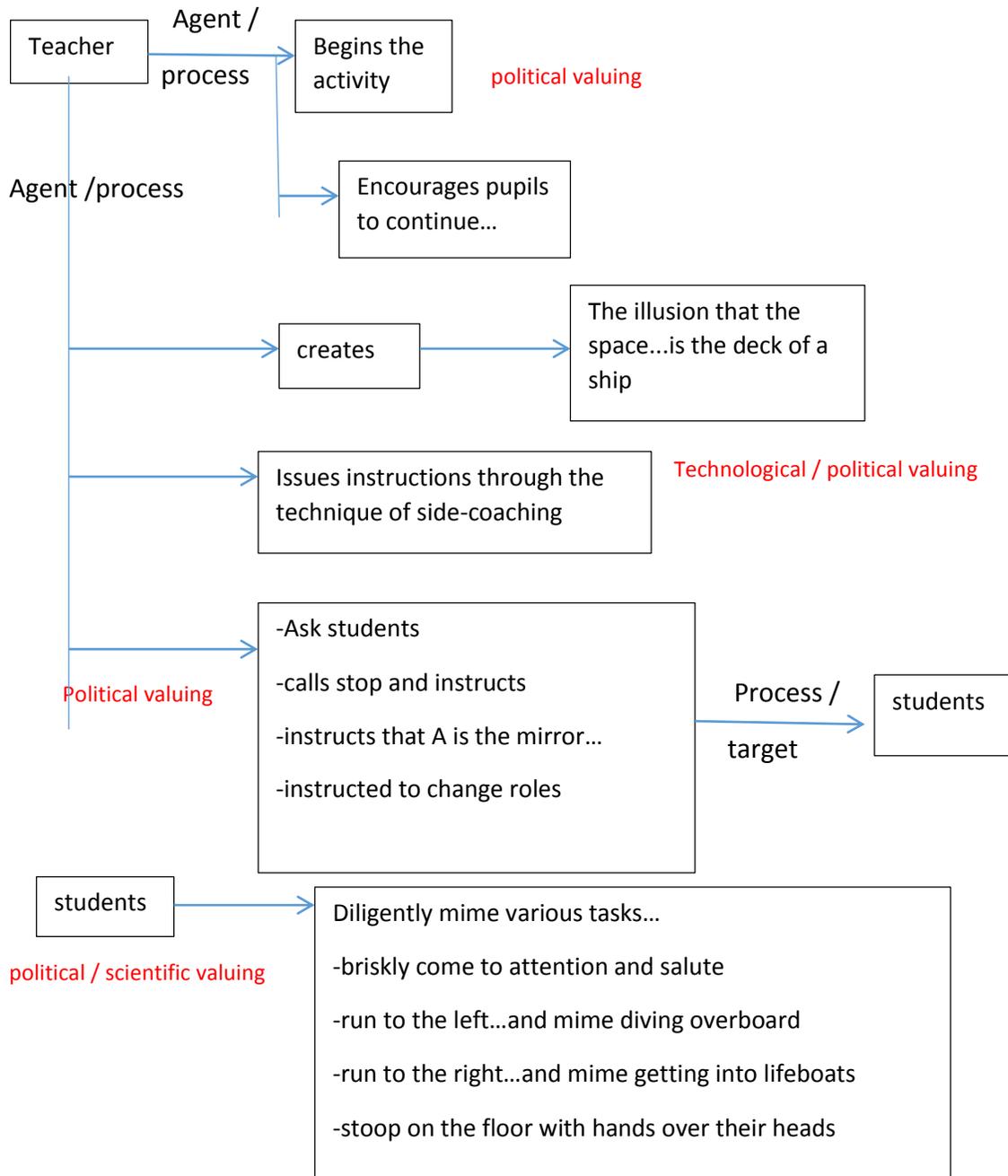


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Appendix 13

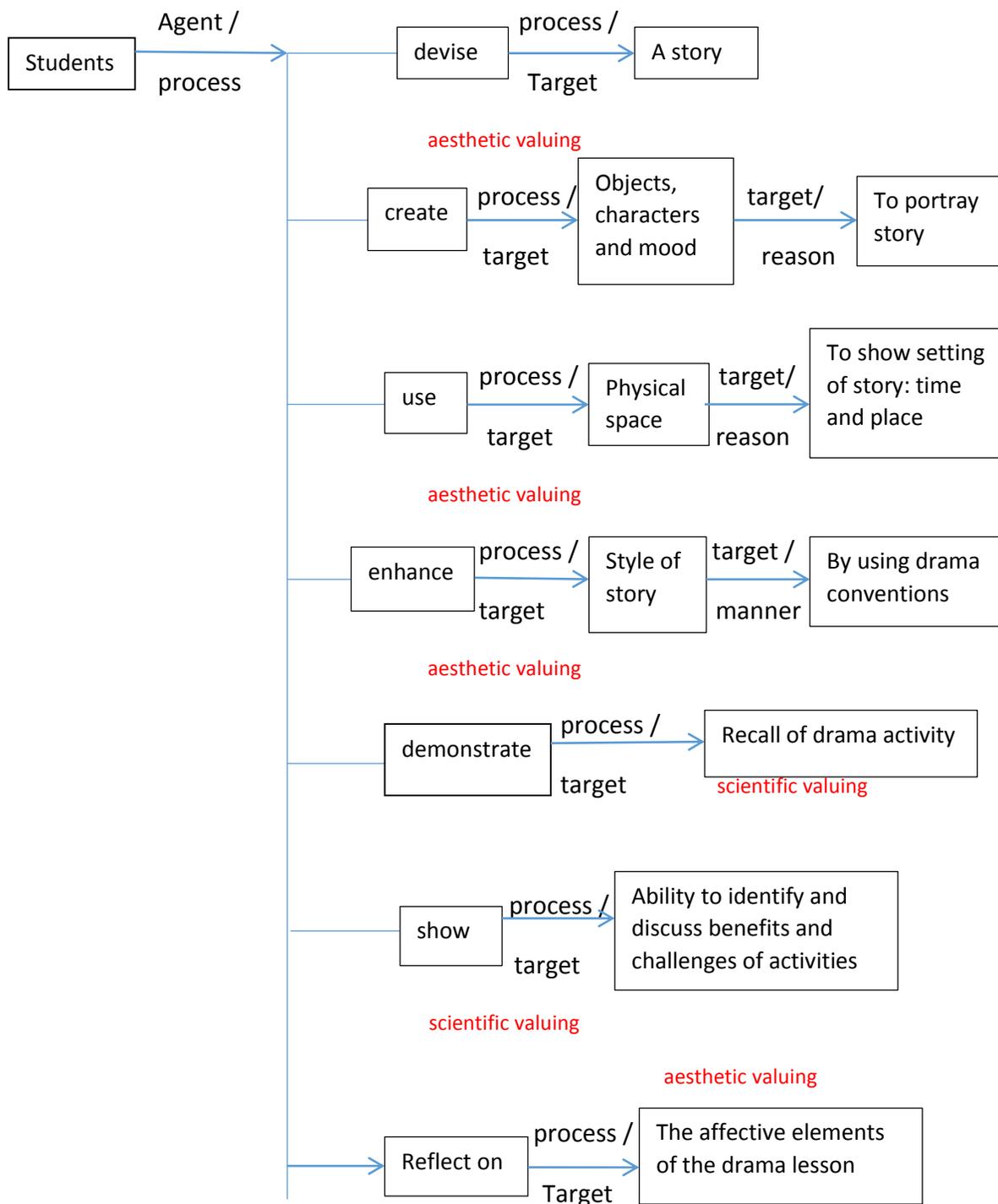
A Thematic Analysis of Lesson 1- Teachers' Drama Manual



Appendix 14

Thematic Analysis – CAC Drama Assessment Guide :

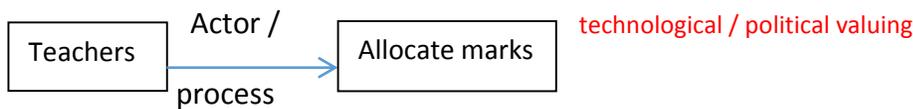
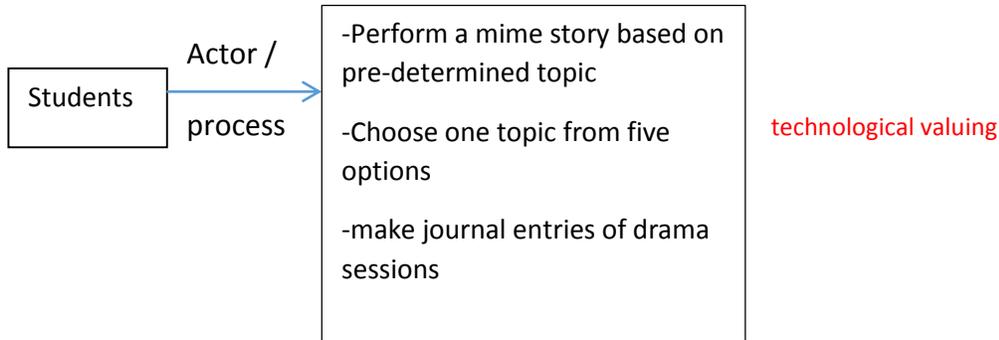
Section Heading - Implementation Plan and Assessment Framework - Skills



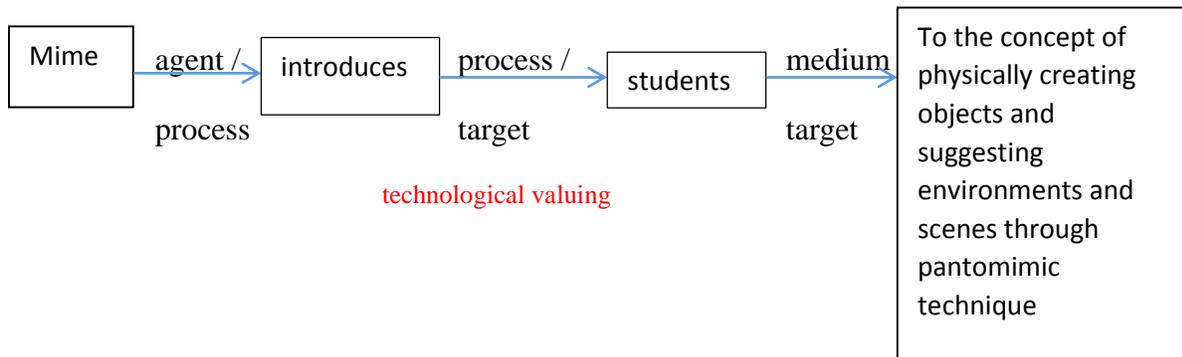
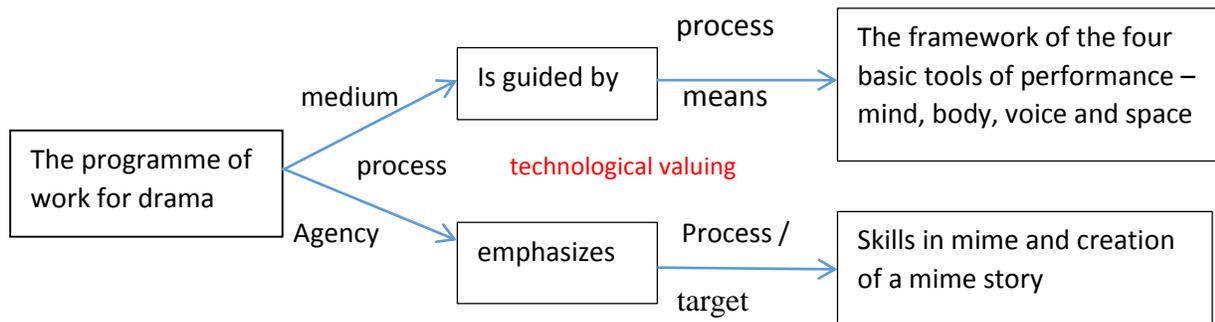
EXPLORING CAC BELIEFS

Analysis of assessment guide cont'd...

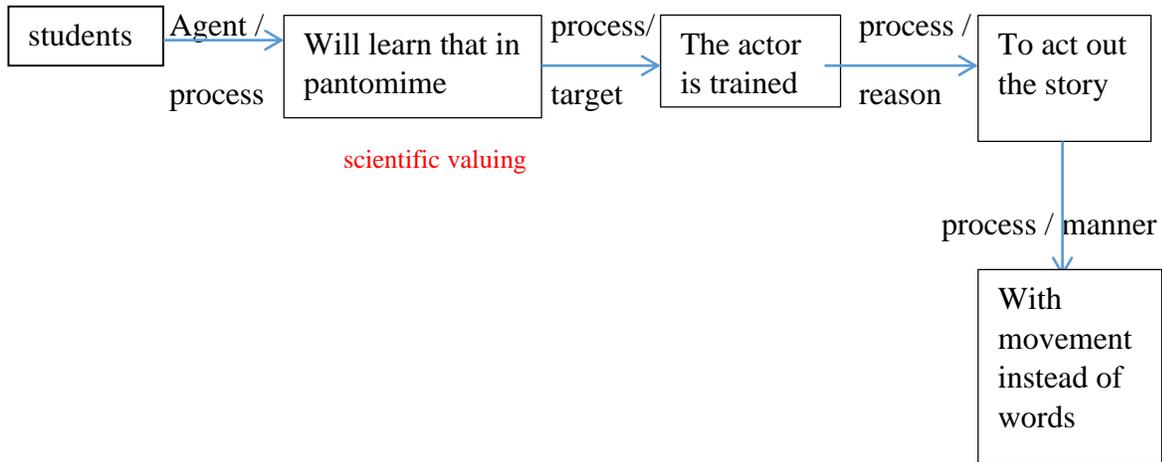
Section Heading - Implementation Plan and Assessment Framework – Details



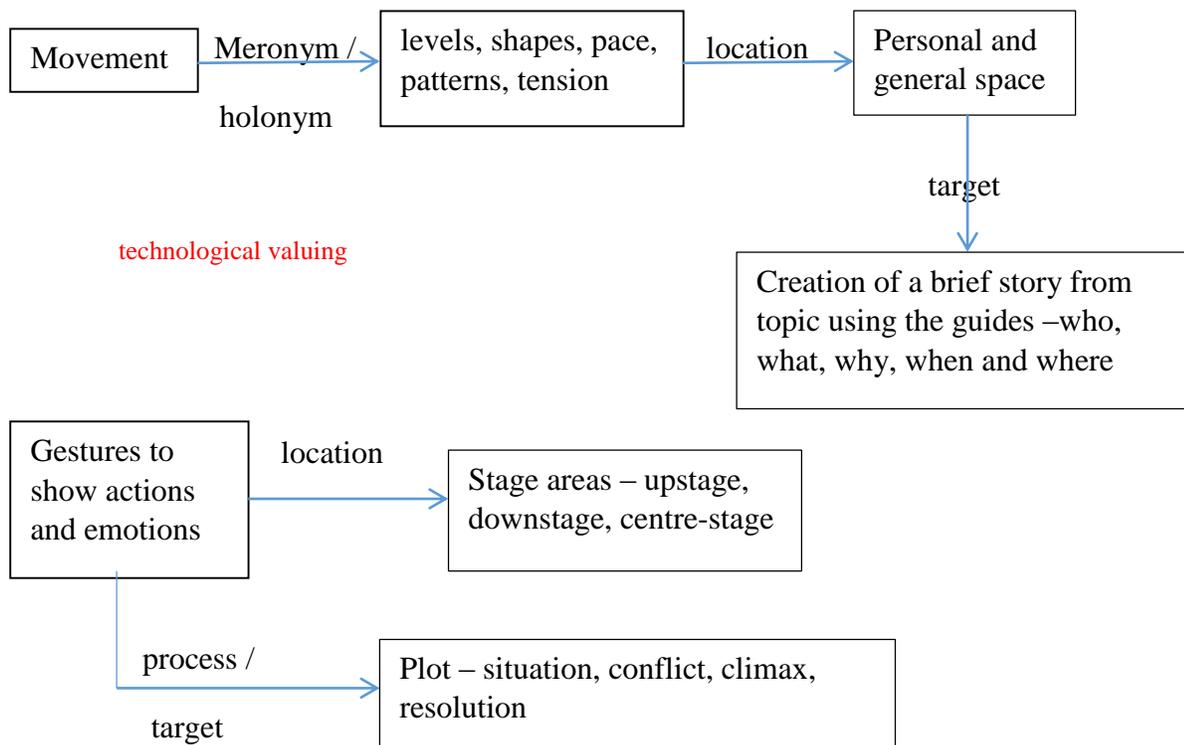
Section Heading - Mime Skills and Development of Mime Story



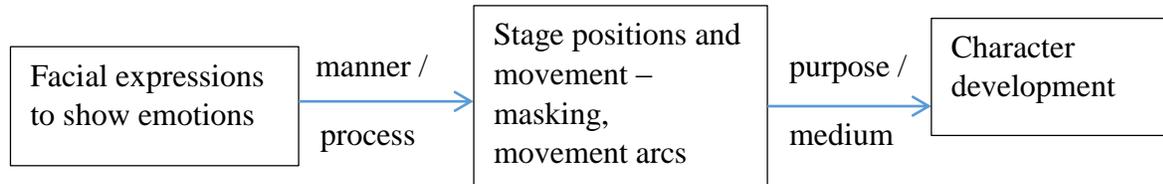
Section Heading – Mime Skills and Development of Mime Story cont'd



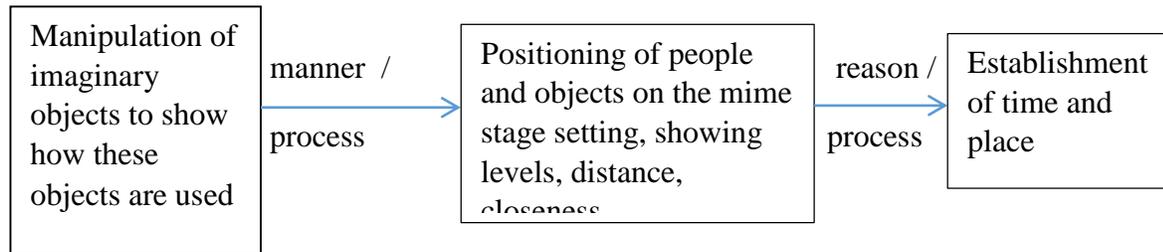
Section Heading – Skills – Set



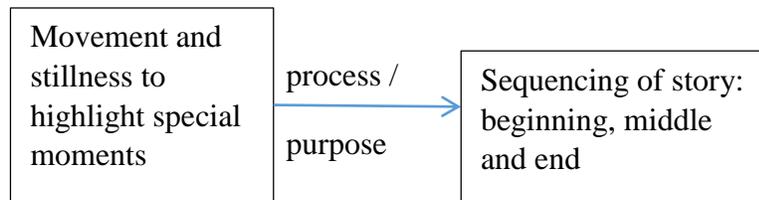
EXPLORING CAC BELIEFS



technological valuing

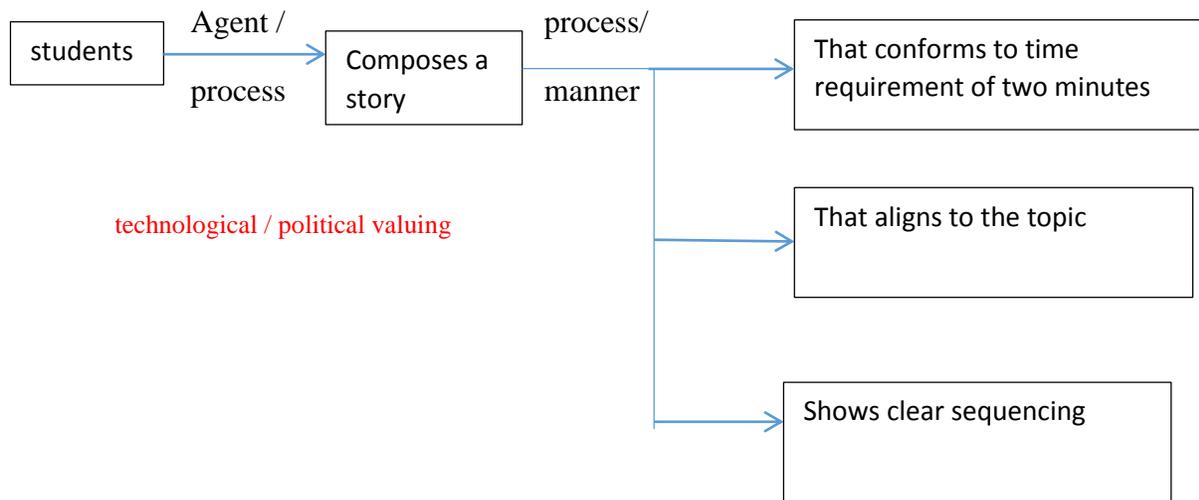


technological valuing



technological valuing

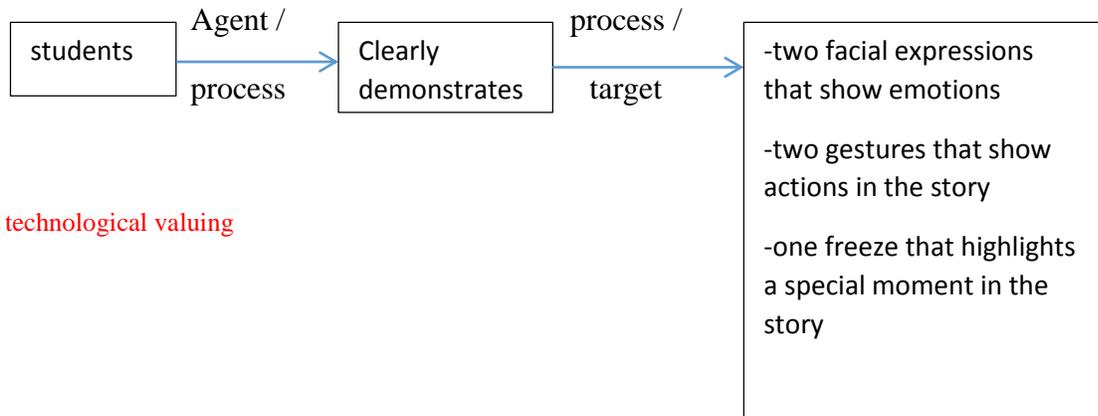
Section Heading - Rubrics for Performance Task – Mime Story



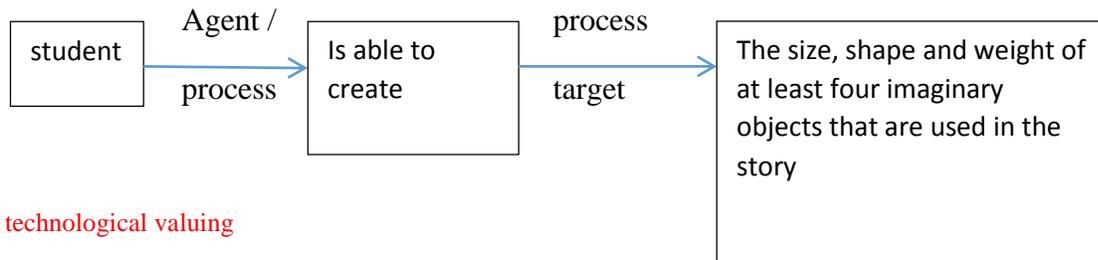
technological / political valuing

EXPLORING CAC BELIEFS

Analysis of rubric for performance task cont'd...

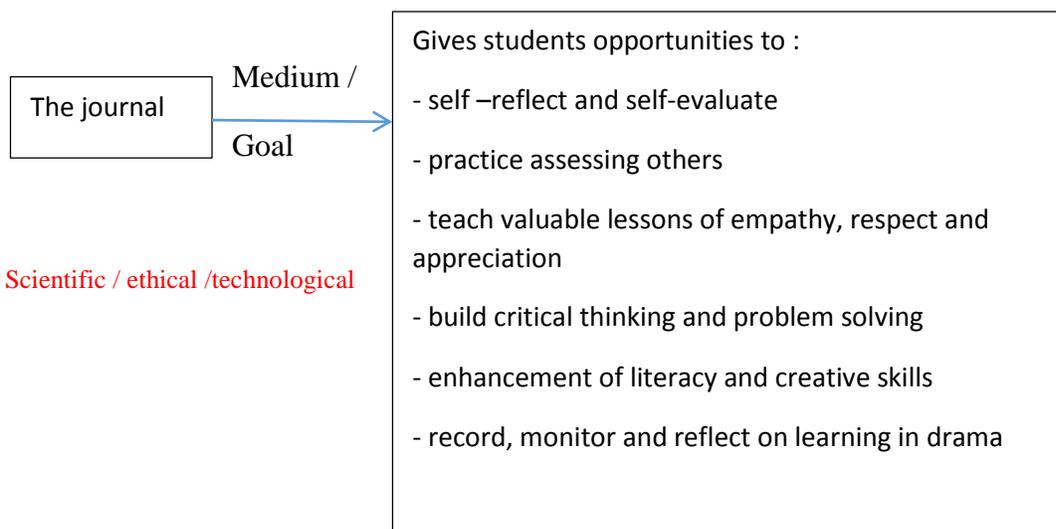


technological valuing



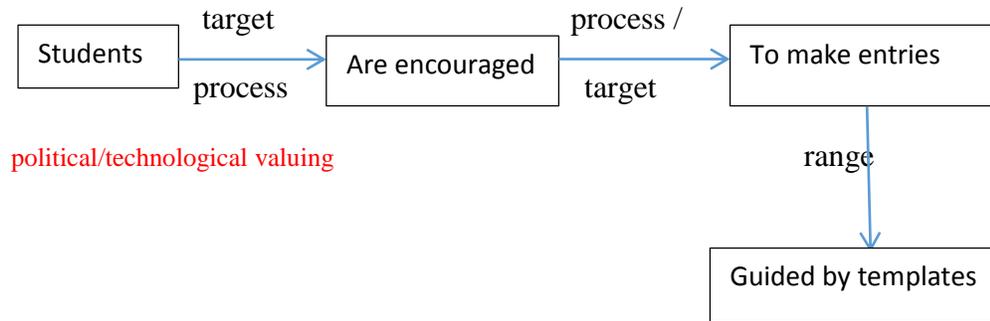
technological valuing

Section Heading – The Drama Journal – Rationale



Scientific / ethical /technological

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Appendix 15

Transcription of the Axiological Beliefs Interview and the Ontological and Epistemological Beliefs Interview

Researcher : Sir, could you please state your age and gender.

Teacher : 38 years . Male.

Researcher : How many years to you have as a teacher?

Teacher: 19years.

Researcher : How long have you been implementing the CAC ?

Teacher. : 2years.

Researcher : Are you satisfied with the training and preparation you received for implementing the CAC?

Teacher. : Not really.

Researcher. : Can you give some insight into what might have been some of the problems you experienced?

Teacher : Some of the componentsthe training that they gave wasn't sufficient for what they expected to be delivered in the classroom.

Researcher : ok

Teacher : Especially for something like Art. I think that most teachers probably don't have the artistic skills that is required for the final product to be. We would have gone through a minimum of training and then expected to deliver that in the classroom. The training that we got is not in sync with what the Ministry is asking for in the classroom for the final product.

Researcher : so we are saying that the trainers have made an assumption of the skills that teachers were supposed to have..... They made assumptions as to what teachers might have had and went forward. And these assumptions seems to be wrong.

Teacher: I think based on what some of these facilitators have said in these training programmes They are basically giving you a crash course ... Because they are on a time frame into how many hours or how many days they have. And so they just have to do those things and you are required to do it in the classroom.

EXPLORING CAC BELIEFS

Researcher : Are you receiving sufficient support for implementing the CAC from your school, the district office or the Ministry of Education?

Teacher : Well you get the materials.... I guess when you come into the classroom whatever skills you think you don't havethen probably you have to do a little research and see how best you can deliver it in the classroom.

Researcher ; but there is no..... If for example, you don't have a particular skill or you don't feel sufficiently skilled to do something?

Teacher. : I don't think there is enough Say for instance like a resource personnel that you could call upon ... You have nothing there.
In the school... In our school we have an art teacher.... So we have that facility...but then?

Researcher : But that is a private arrangement .

Researcher : What was your elective area at teachers' training college?

Teacher : Information and Technology.

Researcher : What educating related professional qualifications do you have?

Teacher: only for education ? The Bachelor of Education in Language Arts.

Researcher : This was done where?

Teacher : U.W.I.

Researcher : what do you think is your most important role as an educator?

Teacher : To try and fulfill each child maximum potential in whichever area that they need to be fulfilled.

Researcher : And what is important to you as an educator as opposed to what you believe is your most important role? What do you think is the most important thing to you personally ?

Teacher: Personally, I think I just try to sync that same thing that I think my role is That's my most important thing. So I do whatever I have to do to try and get the child to be the best that they can be .

Researcher: And could just share with us some of the things you might be doing in the classroom that helps you to achieve this..

Teacher: Right.... One of the things is... If I get children to take ownership..... So I would build little committees . They are different ones. I have ad disciplinary committee based on those students alone.

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So if a child transgresses that committee meets and determines what is the remedial measure that I can take. Of course they will pass it through me and if I agree then they will go ahead . So that children get a sense of that responsibility and those leadership skills.

People who are think are musically inclined , I tend to give them the.....they become the expert in the class when we are doing music. Like for instance, Rachel....rachel has the nack for music. She hears it and she plays it.

So for music ...even for CAC ...at some point in time she was the expert. So I just sat back and looked on and she explained, the children responded to her like a colleague teaching them. They just soaked that in.

Researcher : That's very interesting.

What is the most important thing you teach your students? In your personal view what do you this is the most important thing you teach your students?

Teacher : That there is a life beyond SEA. There is a life beyond. And at the end of the day don't be too myopic. ???? Of how you see life and what kind of person you need to be. That you don't want to be a burden to society. You want to make sure you contribute and then to understand that there is a life beyond these walls. Religion plays a big part in my life and I try to inculcate that spirituality into their as well.

Researcher : And what seems to be most important to the Ministry of Education? In your view?

Teacher: Results. Making sure that the country's marks in terms in whatever they use to gauge. For instance , National test. That seems to go up all the time . So that the government of the day looks like they are performing.

Researcher: Who decides what's important in the school? In the educational process? Who do you think decides what's important.

Teacher. : well one would think that it is a collaborative effort, it should not be just one person dictating what's importantso that you have a think tank put forth what they think is the best way forward and then they implement.....and then they decide what's working or not. I think with the School Based Management would probably come as an important aspect in deciding the way forward in the school.

Researcher : But with School Bases Management do you think that we as a school would have a greater say in curriculum matters?

Teacher : ah.... No. I think that curriculum matters is usually just handed down from the Ministry of Education. So then there is no..... There is a total delink between the Ministry and us the foot soldiers.

So that the limitations that we face...whether we find the curriculum is working or notI think sometimes the challenge to get that back....to make the changes up there where it is necessary.

Doesn't happen.

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Researcher : So, somehow there is a miscommunication or there is a gap between is planned, what happens in the school and what you would call the evaluation of the curriculum? When the curriculum is being taught and evaluated we have a gap in the information going back.

Describe how you evaluate your students learning?

Teacher : well at the end of the day the paper and pencil test holds the sway , however, observation and discussion plays a big part on how you would evaluate. To me critical thinking is important, that's why basically I run a dialogic classroom.

I will tell you for instance in some schools I can't function because of the limitations of space a dialogic classroom is basically impossible and if I were teaching at that school I, as a teacher would not be able to function in a school like this. I need my class to be talking to me. I need to. Have a discussion upon everything I do. I need to know what is going on in their minds.so now I was drawing an analogy to the class ...to the students. If you go to the doctor and you are not well,when you sit down the first question the doctor ask you " what's going on?" With me being able to talk to you and you pouring out what going on in your mind I would be able to help you. If you remain silent whether you are getting it wrong or right or you are confused or in between I would not know. This is why I think conversation is important in evaluating what you know.

Researcher : You speak about conversing and then you spoke about paper and pencil. Do you have any other ways of evaluating?

Teacher : Yeah just to give to give an example... One end of term for science there was a short paper and pencil test but the majority of other things came in a practical display of....we were doing forces at the time and digestive systems....so the children had to produce a working model of forces or digestive system and then explain of what was happening or taking place in the model. And if I chose to pose any other question on what I saw then they had to answer.

Researcher : Right so you measuring process, you are measuring product and the children's ability to think and explain and talk about what you learn.

What changes have you made in evaluating your students over the past 5 years?

Teacher : I think for the past 5 years I have unconsciously geared away from the paper and pencil test. Sometimes it is not really an overall true reflection of the child's ability and their thinking skills. They may be able to express themselves in a different way and they may even have some phobias about paper and pencil tests. I think that we are still dependent on the paper and pencil test even though it is still important because of our education system.

Researcher ; Do you see the paper and pencil test as a limitation.

Teacher : it is a limited way of evaluating.

Researcher : When you explain the ways that you evaluate , you are able to capture children who may not be able to perform well in a paper and pencil test.

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Teacher : Yes I think so.

Researcher : What do you think the Continuous Assessment Component of SEA is all about ?

Teacher: It is a way to encompass all the other different areas to make it count in the school that a child goes to. But still I think the philosophy behind it.....it all comes back to basically a test. And we are not really catering for the child who you would say does good in Music or PE or Agriculture for that matter. Because at the end of the day even the bright children perform well in these areas, so to say that the child who may not be academically inclined would benefit from CAC.

I think that if you were to analyze the data that they get, the bright children still out perform the non academically inclined in the same CAC components.

Researcher : Do you think that the CAC probably gives those same bright children who would not have had the exposure , do you think it helps them in any way?

Teacher : yes I think it does. I have had some very bright students in the last class and they quite enjoyed the CAC....well certain components that is.they did enjoy the Art, even though it was very time consuming.. The drama they enjoyed. I think it gave a little break from the monotony maybe of just the academic part of it.and it did help some of them I think. Some of them are not usually very active, so I think it broadened their horizons to other aspects of education. So much so that you may see the girls would go when they have PE sessions and they would play football and cricket without being told to do so.

Researcher : You are saying that CAC probably showed them things that they did not know about?

Teacher : Yes I think so.

Researcher : They saw and enjoyed things that they probably would not have enjoyed otherwise.

Teacher : Yes.

Researcher : So if the choice was yours alone which of these components (if any) would you actually use and teach in your classroom and not because you have to do it?

Teacher : well I think that is a good question. Well I always liked Language - so my first answer might have been ELA but to be quite honest I think the Drama. I had some very timid and introverted kids in my class especially girls , very shy, and at the beginning they used to be very inhibited but then after a while they would just stand up and do it.They were always ready. They really had fun doing the activities in the drama. I think drama really tapped into a part of their psyche. They really had fun doing the drama.

Researcher : Actually drama encompasses many academic areas.

Teachers epistemological and ontological beliefs interview

Just to go back a bit. One of the things I didn't ask is.....could just state for the record your academic qualifications.

Teacher : Teachers' Diploma, BED in Language Arts,. Diploma in computer programming and software design.

Researcher : what levels have you taught during your career?

Teacher: All

Researcher: Excellent. And which did you enjoy the most?

Teacher : Upper juniors.

Researcher : How successful do you believe you are in the implementation of CAC?

Teacher : I think there are some areas I could do better. Aspects like the Agriculture that I didn't do properly...but then I am not a Agriculture person. The Art....if I could have demonstrated better but I don't have the artistic skills. So basically I would rely on YOUTube to show the kids how to do and what to do.

Researcher : What is your personal attitude towards the CAC?

Teacher : I don't think it is a bad thing. I think the major benefit to me is for the child and the removal of the Creative Writing section on the day of SEA itself and bringing in the writing process where there is no time frame to finish their story. What I have seen is that children can really write. They have to develop and nurture their ideas. Once they get the hang of it, it blossoms into really good stories. You have great writers. But previous to this the system puts a cap on the kids. There is no chance to expand and expound on their ideas.

Researcher : It wasn't developmental.

Teacher: No. So yes I think it was a big plus and of course you know the other areas. I think it is kinda little too much.we are losing the value of what the CAC should be and making it more like ' let's make sure and get it done' .

Researcher : So it appears to me you are thinking that some aspects of the CAC seems to be a concentration by the curriculum people to do a lot and not do quality.

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Teacher : Yes I agree. To me it becomes burdensome to the child. Maybe if they cut down on some of the things that they expect or want ...and allow the child to enjoy these things so that they can produce a piece of quality at the end. I think it will then be more beneficial for the child.

Researcher : So basically how would you describe your feeling about the whole CAC programme in a few words.

Teacher : It is good self-developmental programme for the child.

Researcher : how do you think the students learn? Your thoughts about the learning process.

Teacher: Experience. I think the child has to experience things. I think no matter what you are teaching the child has to make it part of them. Make it meaningful to them so that it becomes imbedded in their psyche. They become one with what they are doing. So that even in poetry which is difficult especially I think for boys....boys tend not to like poetry. If you introduce them to certain things that they tend to relate to their lives...they have a greater understanding. Then they can apply these things in other subject areas as well.

Researcher : For students to learn properly they must do or they must be engaged.

Teacher: Right ...they can't just sit passively.

Researcher: Right they learn that they must learn for themselves.

Teacher . : For me you just have to guide that child. And their learning will happen on its own. There are some things you have to tell them for some subject areas. But even in that you can still present in a way to them and let them bring it out on their own.

So for instance in English Language, ...Active/Passive for std 4.... There are about ten verb forms that they should expose themselves to. There is a table that we will have....and we in the classroom will start from the most basic of the tenses, the simple present tense, all the way to the future continuous, up to the most difficult ones. That table is actually built by the class. I just put one and ask them what they are seeing . Some of them will say they see the verb 'to be' happening all the time. So then we look at where it came from to what it is now, and so that if we know it is in the present continuous tense they will know that the passive has to be a form of the verb to be....so I need the word 'being' because it shows the continuous ... the passive has to show the present tense.

So they build the entire table for themselves. I just keep asking the questions and guiding them. I never ever say this becomes that.They construct the table so that when they get a question they already know that this is the tense ...I must show this...I must show that...I must have this.

Researcher : So they understand why they must do certain things and they just don't know that they have to learn it.

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Well you said a lot just now but I still have to get other further views..
What is your role in the learning process and how to you see yourself fitting with them?

Teacher : When I was in VTC I heard the term facilitator. I never quite understood at that point in time what they actually meant . But then over experience and time you realize that as a teacher, you are not really a teacher per - say. You are more a facilitator of learning. If you present the information to the kids and then through guided questioning the child will actually construct their own knowledge . One child may be able to construct it one way another child constructs in another but in both cases they are right.

Researcher: What sort of things do students need to learn about Science in your view?

Teacher : The way the world works and the way their body works. I think that these are important things now a days. As I told the previous class , they are the generation with the most amount of knowledge at their fingertips but they are also the ' dumbest' generation. I use the word 'dumbest' in this sense. Everything is at their fingertips...they can Google anything, go to Google Maps and visit any place in the world. All the information that they need is there. But they don't spend the time doing these things ...so that things we would have learnt when we were younger ...they don't know and have no idea.

So that I think the science can cater for these things. But we have to make it a 21st Century science curriculum...and a way of making sure these children know these things. Take for instance a topic like Climate. The world is changing, climatic changes are happening all the time, but the children may only know the sun and the rain. Just because we live in Trinidad doesn't mean we don't have to tell them about snow and these things. But the climate in the north impacts on us in the tropics.

And so that little things we can show them that it is not really a large world. All of us are connected in some manner..a global village so that what I do here can affect someone in Norway.

Researcher: Sir you tell me that with respect to Science they need to understand the world and they need to understand themselves. So this is what is important for the children to learn about science. The process of science....how to go about learning and then you have concepts. Well these things are concepts. So what about the process? How to you feel about process?

Teacher : In the last class I had, a std 4 class, I did the scientific method and the children understood was a hypothesis and we developed hypotheses, which is what I did in standard three as well. We tried to create experiments to prove and see if the hypothesis was true or not. So that they can understand like in a household for instance.. There is the concept of hard and soft water...how does that relate to everyday life or is it just hard and soft water. For a housewife the concept of hard and soft water is beneficial economically because they would know how much of detergent they need to use, which detergent is the best? Which toilet paper is the best? You know, ways to try to come up with little experiments to test these things. I think. It has to go hand in hand.

Researcher: And what about Drama? What do you think they should be learning about from your experience?

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Teacher. : I know with the CAC they wanted us to do specific things. But from what I learnt in a drama course in my B Ed programme you had to marry a skill with a lesson. You had to marry it with other subject areas. Integration. You can't just say you are teaching miming for miming sake. You have to make it so that when you have to create the situation for them to mime, you have to link it with some other area then it becomes meaningful. Yes Drama is important because it can be used as a tool for integration.

Researcher: So you see it more useful in the integration process. Do you see the need for it to be taught as a core curriculum? How do you feel about that?

Teacher: I think it can be useful, but more with integration. But they know doing mime. Now if any child has that inclination when they go to higher levels they could probably branch off into higher levels. I think at the primary level it would be more beneficial in the integration.

Researcher: Than actually doing it as a core curricular area for drama sake. You don't see it as a necessary road to go.

Teacher: I still think it has its benefits. Even if you do the integration not everybody will have a chance to do something. Yes I think there should be a period where it is taught. Again the choice is on the teacher where it is not just taught in isolation from the other subject areas.

Researcher: I think I understand. You are saying that you should have Drama core but at the same time there should be integration so that there is application in the other subject areas.

Teacher: Yes.

Researcher: During lessons what sort of interaction do you like to encourage or to see taking place in the classroom?

Teacher : interaction between peer and peer is always difficult because of the setting that they have. Because that entails what we call some measure of constructive noise, but it is noise nevertheless. Then we don't have individual classrooms. So the noise filters into the other classrooms and disturbs others.

Interaction happens a lot between everybody at the same time. Teacher and child. I always encourage children to disagree so that if a child makes a point if we have a discussion on whatever topic a child should be able to say " I don't agree with that" . I want everybody to be able to share their point of view. That's the interaction I always seek to get, regardless of whatever topic we are doing. Like in Maths....you solve it this way or is there another way if anyone wants to show us. Then we get more than one problem solving technique. Because at the end of the day when you have a timed test you might want the strategy that is not only the quickest but the easiest. A lot of critical analysis of what we are doing.

Researcher: what about interaction with materials? What about interaction with situations? Or maybe even places? How do you feel about that kind of interaction and the actual lesson?

Teacher. : when you say places?

Researcher: Field trips. You go to see places and actually interact with say a river?

Teacher; These things are very important but they are not always practical to do. So that is why I try to integrate technology as much as possible into the classroom. For instance, when we had to do a report we had to go on a field trip. So I took the kids to the Caroni Bird Sanctuary ...but in the classroom. I got a video on YouTube on the place and we viewed that. The video was filmed from a boat.

Researcher: Which is exactly what they will do.

Teacher: So we went on the tour but we did not leave the classroom. Because the logistics of actually going there is impossible.

Researcher. : yes I understand. OK. How do you decide what you teach and what you don't want to teach? Thou know you have a curriculum and you have so much to do. How do you decide what you teach and what you don't teach?

Teacher: well if it is on the curriculum it has to be done.

But I'll tell you usually the children decide ,without them ever knowing they have decided how that lesson is going to go and where it is going. And if I find that there is a discussion happening and it's taking them to a higher level of thinking, I allow it to go on. That's why a lesson is done when in their minds it's done.

That's why someone may think I am teaching a lesson for more than an hour...but it is just the children engage in discussion and once the discussion is taking place and going on...and not going outside the parameters of what we talking about I allow it to go on until they are satisfied in their minds that 'I' understand.

Researcher: so more or less the children have a lot of say of the eventual learning and even some of the concepts that are learnt.

And how do you know when learning occurring in your classroom? How can you tell that?

From discussion. The responses that you get, the interaction that you will get...I will know. So if I see a person who is very passive, I will just interject and so "so what do you think?" I get them to try and open up and participate. It is through that discussion and interaction that I realize whether they are grasping the concepts or whether they have a little confusion. I will look at their facial expression as well and if someone looks as if something piqued in his mind I will look at him and ask 'what you thinking? And throw that into the pot.

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Researcher : you get them to talk, you look at their facial expressions, their body language. So eventually how do you decide whether they understand or not? Or you know learning is taking place?

Teacher: Usually what happens is if not that day or the day after later I would throw a scenario that is kind of similar but different in some aspects from the one discussed and question them on it. I will see now if they can link what they did before to this problem now.

So if it is a grammar rule I would bring the sentence completely different. I would change the structure of the sentence but it is the same rule and ask them what the answer is and why?

Sometimes I would make them close their eyes then put their hand up for the answer.

So if it is a simple "has or "have " answer I ask how many think it was "has " and they would raise their hands but their eyes are closed. Sometimes just to trick them as sometimes nobody raises their handsI would say hands down. But nobody had their hands up. Just to make sure in their minds they are actually sure of what they believe the answer is. Then I would tell them so many people said this and so many people said that.

Then I would ask "ok what did you say as the answer?" "Why?"

I will give you an example. I had asked a question and I think the answer was either who or whom.

3 persons had it right. I realized based on their facial expression they were concerned because it was 3 out of 30 students. Then I asked who wants to change their mind? 2 out of the 3 changed their answer only because the other friends had voted against their answer. They did not realize that they were in fact correct.

I said that if you think this is the answer stick to it regardless of what the majority might say. The minority might be right. Coincidentally I think that question showed up in a couple of the tests that we did. Everyone got it right.

Researcher : The thing is about when you are evaluating their understanding you get them to see, take chances, to talk, and you also get them to explain why they are choosing their answer. They must give a reason.

Teacher : Actually I learnt that from my standard 5 teacher, who was also a principal, he always believe that if you gave an answer in grammar you had to accompany the answer with a reason.

His philosophy was that if you gave an answer but you don't know why you are guessing. There must be no guessing. So every time you give me an answer I must know why.

If you chose a process in Maths I want to know why. And I think the more they explain the more concretized it becomes and then no matter how the answer comes they would be ready.

Because they would probably explain it a hundred times and so they would see it and immediately know the answer.

Researcher : It becomes marked in their minds . Their explanations helps in building their understanding.

Well sir, I do want to thank you very much for your time. I want to again assure you that anything said in this interview will be held in the strictest confidence and the data will be used

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