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Rose M. Mugweni

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Early Childhood Development (ECD) Teachers' Conceptions and Implementation of the Child-Centred approach to Teaching Science

Rose M. Mugweni
Great Zimbabwe University, Zimbabwe

Abstract

The study investigated ECD teachers' conceptions of the child-centred approach and strategies they adopt to implement it when teaching environmental science in infant classes. A descriptive survey was conducted to investigate the research problem. Information from the teachers was sourced via a questionnaire, semi-structured interviews, analysis of documents and lesson observations. Stratified random sampling was used to come up with a sample of 30 ECD teachers in five primary schools within a 25 kilometre radius of Masvingo City. The study found out that the child-centred approach to teaching science in ECD classes was not well understood by the teachers and it was not being effectively implemented in ECD science classes. A number of constraints which rendered implementation of the child-centred approach to teaching science in ECD classes ineffective were unravelled. All the teachers indicated that large classes, lack of sufficient resources, teachers' insufficient knowledge of the approach and lack of conducive learning environments in ECD classes militated against effective implementation of a child-centred approach to teaching science. The study recommended that there is need for regular staff development workshops. ECD teachers should be provided with enough teaching and learning resources. There is need for continuous monitoring of the child-centred approach to ensure its effective implementation to teaching science in ECD classes. A system should be developed and operationalised where samples of media improvised by some of the ECD teachers are forwarded to Audio Visual Services for mass production so that all schools in the country benefit from the creation of innovative teachers. Lastly, it was recommended that the teacher-pupil ratio should be reduced from 1 teacher to 40 pupils to manageable classes of say 1 teacher to 30 pupils for ECD classes.

Keywords: Child-centred Approach, Teaching Strategies, Conceptions, Implementation

Background to the Problem

The child-centred approach has been looked at from different perspectives and experiences by different authors. Rauche (1985), observed that no scientific theory or approach is conclusive and absolutely true, but that it is liable to modification through the discovery of new data. The

child-centred approach is a teaching approach with positive and negative consequences which any country adopting it as a basis of any curriculum should note (Salia-Bao, 1987). Consistent with the view, Entwistle (1990) asserts that, the child-centred approach is not a small task if a teacher has a responsibility for thirty or more children.

On the other hand, advocates of the child-centred approach postulate that, the true beginning of instruction lies in direct experiences with the environment and learners should be seen as having individual differences which are in part reflective of their experience. It implies that, the 'whole child' is the proper subject for education, and the curriculum should originate through observation and the study of children's interests and needs, rather than through the analysis of subject matter. In recent years, most learning programmes for young children use a child-centred developmental curriculum, designed to provide for individualised levels of participation.

In essence, the child-centred approach is a modern approach to teaching and learning in which the emphasis has shifted from the teacher to the student. It is a macro-approach which encompasses micro-units/methods like problem-solving, discovery, group work, play-way, project, questioning and discussion. The approach was first implemented in western countries like United States of America and Britain, and it was advocated by philosophers and psychologists like Rousseau, Dewey, Kilpatrick and Piaget. In 1994, the Zimbabwean government, influenced by the philosophical theory of progressivism and in a bid to consider progressive methods in its educational system, adopted the child-centred approach as an essential method for the effective teaching and learning of science.

Regarding the child-centred or progressive theory, what is to be learned should be determined by a child's nature of development (Darling, 1994). The concept child-centred approach denotes: learning through experience, active learning, discovery learning, problem solving and the play way method (Salia-Bao, 1987; Nacino-Brown et al., 1994). The approach is based on the belief that the education of the child should focus upon the child's natural tendencies and development from within, and not from the imposition of adult standards from outside (Barker, 1994). I reason that the child-centred approach is in direction opposition to the teacher-centred methods. It is an approach which respects the individuality of the learner.

The child-centred approach enables a child to attain his/her beliefs, hopes, choices, feelings and wishes in the process of his/her education (Bishop, 1994). When using the child-centred approach, more concentration should be on the child's active reconstruction of experience. Dewey, cited by Bishop (1994), argues that instead of fitting the young child to the school curriculum, the curriculum should be adapted to suit the child. The significance of Dewey's argument is that what is taught in science at ECD level should be of more interest to the child and not necessarily to the teacher. Hence forth using the child-centred approach to teaching science should be seen to enhance a child's beliefs, hopes, wishes and needs.

Studies by Williams and Fromberg (1992) revealed that the awareness of the child-centred approach has contributed to developmentally appropriate curriculum and practices. Literature shows that the acceptability of the approach in ECD classes and its implementation has influenced the use of teaching methods like; discovery, experimentation, group work, questioning and discussion when teaching science (Entwistle, 1990). Consistently, Farrant (1993) avers that the child-centred approach is neither sentimental nor child-controlled, but that it is simply a realistic response to what we know about children, their development, interests, needs and personal characteristics. From the historical perspective of the child-centred approach, it is evident that the approach is effective and has stood the test of time (Pollard & Borne, 1994).

It is observed that the theory's pedagogical implications fail to meet reality in the classroom situation (Darling, 1994; Salia-Bao, 1987; Rauche, 1985). In his studies, Entwistle (1990) content that the child-centred theory is difficult to implement with few resources, large classes of about thirty or more pupils, limited teacher expertise and limited teacher competence. Entwistle's observations are very important as the same factors were also found to influence the implementation of the approach in this study.

Zimbabwe is no exception in adopting the child-centred or progressive philosophy. According to Siyakwazi (1995), the child-centred approach was first adopted in Zimbabwe around 1963 after the success of the 1961-1962 Hope Fountain Experiment on Teaching Methods (The New Approach). The pioneers of using the child-centred approach in Zimbabwe are Miss Joana Moyo, Mrs Joyce Childs and Mr Macdonald Partridge, who collaborated in undertaking the experiment on progressive teaching methods and also orientating infant teachers on the child-centred approach. The belief of the pioneers was that children can learn anything provided an appropriate environment has been created.

In Zimbabwe, the 1966 Education Act adopted the use of the child-centred approach as policy which resulted in the orientation of four thousand Grades one and two teachers throughout the country on the approach (Siyakwazi, 1995). The adoption of the child-centred approach to education in Zimbabwe is also evidenced in the government document 'Growth with Equity' (1981). Article 78 in the document states that, it is policy, that Zimbabwean educational objectives be achieved through child-centred and developmental methods. The 1994 to date Environmental Science Syllabus for grades one to three declared in its methodology that a pupil-centred approach is essential for the effective implementation of the syllabus. These declarations and observations are important in this study because the benefits derived from using the approach will be pointed out in the data presentation and analysis.

In the child-centred approach, the teacher is encouraged to use active learning, discovery and problem solving modes of teaching (Victor & Kellough, 1993:63). The problem-solving approach is in line with the implication of the saying by Bishop (1994:102):

I hear, and I forget.

I see, and I remember.

I do, and I understand.

This implies that when young learners are not actively involved in the learning process in science, they simply hear and forget. As opposed to the passive traditional learner, the learner in the child-centred philosophy is intellectually curious, keen to find things out and to actively engage in making sense of the world he/she lives (Darling, 1994). What a child-centred approach teacher should do is to provide planned and unplanned opportunities for the learner to identify and tentatively solve problems (Victor & Kellough, 1993).

The child-centred philosophy is opposed to the expository methods which Bishop (1994) calls "The jug and mug method" and which Freire (1996) calls "The Banking Concept of Education". In Bishop's view, it is unfortunate that old approaches to teaching are still prevalent in some of the contemporary classrooms. In using the expository methods, Bishop (1994) observes that the teacher who is the fountain of wisdom is the "jug" which fills with knowledge the child, who is considered the empty "mug". When using the expository methods like lectures and narration, it was found that the relationship between the teacher and the learner becomes that of an active disseminator of information and a passive recipient respectively (Baker, 1994).

Victor and Kellough (1993:47); Nacimo-Brown et al (1994:87) outline the advantages for using the discovery method to teaching. Firstly, it provides for understanding rather than rote learning and creates an increase in intellectual potency. Secondly, pupils learn concepts and principles which are more easily remembered than isolated fact. Thirdly, they also learn to find out things independently. Fourthly, pupils are actively engaged in the process of acquiring knowledge instead of being passive learners. Lastly, the knowledge from discovery learning is easily remembered and recalled when needed.

Ausubel, Gange' and Bruner strongly urge teachers to use the discovery method when teaching science in ECD classes (Victor and Kellough, 1993). Ausubel also cautions against learning by rote. Studies by Barker (1994); Bhunhu (1992); Victor and Kellough (1993) also confirm that discovery has become one of the recent teaching methods which allow children to be free and creative. In Dewey's opinion, the process of thinking involves the action of organizing, manipulating and interrelating facts and concepts. Advocating for the teaching of science using a pupil-centred approach, Althouse (1988:vii) avers that process science is an open-ended approach, and the direction learning will take place is determined for the most part by the children.

Reflecting on the benefits of the approach, it is unfortunate to note that science is often taught to your children through demonstrations, lectures and narrations, in the form of facts concepts and generalizations; rather than through active and discovery learning (Althouse, 1988). Teaching Science through teacher talk reduces it all as if it was only composed of social knowledge, which people pass to one another socially by talking. A holistic child-centred approach should to be adopted as a methodology for Science teaching.

Piaget, a cognitive psychologist, describes three kinds of knowledge which children acquire during the process of learning Science (Althouse, 1988). These are: logico-mathematical knowledge, physical knowledge and social knowledge. According to Piaget, physical knowledge is derived directly from objects (colour, shape, size and texture), and from how objects react (roll, bounce). Logico-Mathematical knowledge develops from children's actions on objects and how they create and invent relationships among objects. Social knowledge is acquired socially by being told. According to Piaget, it is Logico-Mathematical knowledge which is of essence in teaching and learning. It is through discovery, exploration and experimentation that children acquire Logico-Mathematical knowledge. While physical knowledge is acquired through direct apprehension by the senses.

Hence forth in teaching science in ECD classes, teachers should promote the acquisition of physical knowledge and logico-mathematical knowledge through process skills. Carin (1993) defines a process skill as any cognitive process involving interaction with content and concrete objects. A review of studies carried out in Zimbabwe by Parker (1984); The Lewis Taylor Report (1974); Lewin and Bajah (1991); Shumba (1995), on teaching of Environmental and Agricultural Science in Primary Schools, including ECD classes reveals that much classroom interaction is done through discussion. The researchers found that there tends to be teacher dominated lessons with very little negotiation between the teacher and the pupils. The lessons observed in these studies involved a lot of teacher-talk (lecturing) and little discussions.

The Research Problem

The aim of the study was to explore and establish ECD teachers' understanding of a child-centred approach, the strategies they adopt to implement it when teaching science in infant school classes, as well as highlight the benefits and constraints experienced in using a pupil-centred approach to teaching science. The following research questions guided the study: What are the ECD teachers' conceptions of the child-centred approach? Which teaching strategies do teachers employ to teach science in their ECD classes. What are the benefits and constraints derived from using the child-centred approach to teach science in infant classes?

Due to the long standing debates that exist between those in favour of the child-centred approach and its critics, a study on the implementation of the approach in ECD classes the Zimbabwean context was justified. Also, since no comprehensive study has been done relating the approach to the teaching of science in ECD classes, the researcher found it worthwhile to carry out the study in an effort to extent the existing knowledge base.

Research Methodology

The study employed the descriptive survey design. Designing the research project involved organizing, collecting and analysing data to fulfil the purpose of the research and to provide answers to a research questions (Vos et al., 2011). A survey design was adopted in order to obtain information that can be analysed, patterns extracted, parallels drawn and meanings created (Creswell, 2008).

The research design was both descriptive (quantitative) and analytical (qualitative). The study was descriptive in that the data collected was quantifiable. It was qualitative in the sense that a structured a closed and open-ended questionnaire and structured open-ended interview were used (de Vos et al., 2011). Documents were analysed ECD science lessons observed. A questionnaire was used because it could solicit information from many respondents within a short space of time and the subjects were capable of responding to questions on their own. The descriptive survey design was chosen because in most cases it obtains information from a selection of the population which becomes a representative sample of the population as a whole.

The population was made up of 88 trained teachers in 19 Masvingo Urban and Peri-Urban Primary Schools within a 25 kilometre radius of Masvingo City. The researcher chose this population as it comprised almost all categories of schools under different responsible authorities that are Private Schools, Urban Council Schools, Mission Schools and Government Schools. This population was also easily accessible to the researcher. It was impossible for the researcher to involve every infant teacher in Masvingo District in the study because of financial, material and time resource constraints. Due to the identified constraints, the researcher selected a representative sample for this study (Leedy & Omrod, 2010).

30 infant teachers from five selected primary schools in Masvingo Urban and Peri-Urban constituted the sample. The sample made up 34% of the population of the study. The whole sample was made up of female teachers. The 30 infant teachers selected made up 100% of the intended sample size in the study. Of the 30 infant school teachers in the sample, 18 completed the questionnaire while 12 were interviewed and 4 of those teachers who had either been interviewed or had completed the questionnaires were also observed teaching science lessons.

The 30 ECD teachers were chosen to satisfy Cohen, Manion and Morrison's (2011) argument that as a matter of advice, a sample size of thirty is held by many to be the minimum number of cases if the researcher intends to use some form of statistical analysis on the data. The researcher divided the 19 schools in the population frame into strata according to responsible authorities. One school was then randomly picked from the five strata of the population frame to come up with a sample of one Group A Private School, one former Group A Government School, one Mission School, one Urban-Council School and Rural School. A total of five primary schools were selected. All infant teachers at the selected schools totalling 30 made up the sample for the study

A questionnaire, interview schedule and analysis of documents and lesson observation schedule were used as instruments to collect data. The questionnaire used in this study was made up of two sections Section A had 6 closed-ended questions on demographic information about the teacher. Closed-ended questions were used in this section because the information solicited was straight forward and were also easy to obtain. Section B had 24 questions which solicited information on infant teachers' conceptions of child-centred approach and the strategies they adopt to implement it when teaching science. Descriptive statistics was used to interpret the

data. This statistical analysis was chosen since it is relatively simple and convenient. It clarifies raw data and makes it easy to interpret, through organising, summarising and describing the researcher's observation (de Vos et al., 2011).

Results and Discussion of Findings

Regarding ECD teachers' conception of the child-centred approach to teaching science, generally there was a gap between teacher understanding and teacher practice. 90% (27) of the teachers showed a basic espoused understanding but they did not apply the approach in their science lessons. 10% (3) teachers confused the approach with the teacher-pupil interaction. A discrepancy arose because there was a disjuncture between theory and practice (Hargreaves, 2005). While teachers had a basic theoretical knowledge of the approach, they did not apply the approach to their teaching of science. Mostly the teachers were using discussion, question and answer, group work, narration, role play and in one extreme case the lecture method. None of the teachers used the discovery and experimentation methods.

In the documents analysed, there was also no evidence of the use of the discovery method. Other child-centred related methods like group work, discussion and experimentation were seldom used. Reasons advanced for this state of affairs by the teachers include lack of resources, large classes and insufficient time to undertake exploration and discovery. The majority of the teachers however, showed child-centred approach qualities when teaching such as acting as guides and facilitators of children's learning.

It emerged from the empirical data that some of the teachers supported teacher-centred methods to teaching science in ECD classes. The following were some of the phrases used by the teachers who supported teacher directed work; children must be directed, if children are not directed and told what to learn, there will not be meaningful learning. Those who were against teacher directed work said the following: it forces children to engage in rote learning; children can learn on their own; children are not passive recipients of experience; children learn best through active participation and lastly, teacher directed work does not give children room to express themselves.

All, 30(100%) teachers reported that use of concrete media and play are an important vehicle for discovery learning. The following were their justifications: it develops the whole child; play is part and parcel of an infant child's life and it enhances learning; learning becomes more fun and less taxing when done through play; it gives children a chance to express themselves and learn while acting and children catch up with concepts easily, quickly and freely.

When teachers were asked whether they benefited from using the child-centred approach, although the teachers were not applying pupil-centred methods in their science lessons, all the 30 teachers (100%) indicated that, the approach enables them to: know their pupils; stimulates their interest and imagination and they become aware of children's needs' lets children share ideas with them and creates an environment where there is more interaction between the teacher and the child.

The major constraints highlighted by infant teachers while using the child-centred approach to teach science were in rank order were: large classes, lack of or insufficient resources, materials or media; lack of discipline or difficulty in instilling discipline in pupils; insufficient knowledge by teachers on the concept; the approach was also being viewed as time consuming and the lack of conducive environment for its effective implementation.

An analysis of these observations indicated that there could be other underlying issues like the reluctance by teachers to implement the approach when teaching science (Bantwini, 2010). It is also possible that, since the curriculum is examination oriented, the teachers may be using methods which they believe make children grasp concepts fast. Empirical data from the questionnaire and interviews show that most of the ECD teachers have a basic theoretical knowledge of the child-centred approach.

These findings are contrary to the assertions by Darling (1994) that pupils are intellectually curious, keen to find things and that they actively engage in making sense of the world around them. Furthermore, 60% (18) of the teachers did not encourage and stimulate higher order thinking in children by asking them open-ended questions. Higher order questions solicit ideas of substance from the children; unlike the closed-ended questions. 40% (12) of the teachers in the study, asked lower order questions which solicit one-word responses without developing reasoning. However, most of the teachers viewed experiments as relevant to the teaching of science.

On whether teacher directed work is the only efficient way for children to learn, 80% (24) of the teachers reported that they use other methods for children to learn science besides teacher directed work. However, lesson observations, revealed that the general methods used by the teachers were discussion, group work, question and answer, play-way and teacher-talk. Teacher-talk or narration is not a child-centred approach method. Friere (1996) contends that education is suffering from narration sickness, he condemns teacher talk as a method which reduces pupils to containers or 'receptacles' to be 'filled' by the teacher who becomes the narrator. In both the analysed documents and the observed lessons there was no evidence of the use of exploration and discovery method. This implies that in most cases infant teachers in ECD classes use methods like group work, discussion, play-way, experiments and question and answer, but the core methods of the child-centred approach, that is, problem-solving, discovery and exploration are not used widely.

With regards to the provision of resources and support services given to teachers to implement the child-centred approach to teach science, 67% (20) of the teachers indicated that they do not have sufficient media to use when teaching Environmental Science using the child-centred approach. Only 33% (10) indicated they had just enough media and would be happy to secure more. This state of affairs is not conducive to the effective implementation of the approach as is observed by Entwistle (1990) who argues that the approach is difficult to implement with insufficient resources. Hence, the research noted the disparity of a gap between teachers'

theoretical knowledge and their low practical implementation of the approach which is cause for concern.

Insufficient resources may be contributing to the low application of the approach. This is also supported by Burgess et al (2010) who found that visual materials are in short supply in almost all schools. Manjengwa (1994) also suggests that a child-centred approach classroom must be a hive of activities. This is not possible with in-sufficient teaching learning resources. Although teachers are expected to be resourceful and to improvise, it is rather straining to attain effective implementation of the approach with a class of 44 pupils. Hence these findings imply that generally teachers are not well supplied with teaching/learning media in order to implement the child-centred approach.

The empirical data also reveal that 33% (10) of the teachers had not been supplied with the 1994 Environmental Science Syllabus. It is this syllabus where the child-centred approach is declared as the essential method for effective implementation of the ECD science curriculum. The issue is how then a teacher can effectively implement the syllabus using the recommended approach if he/she has not yet seen it.

Furthermore, the findings reveal that only 50% (15) of the teachers have been supervised by School Heads and Teachers-In-Charge teaching science. This implies that 50% (15) of the teachers are figuring it out on their own how to implement the approach without knowing whether they are correct in their attempts.

Among those who were supervised, they indicated that the supervision was just one of the routine visits without an emphasis on the implementation of the child-centred approach to teaching science. The issue here is whether the school administrators (School Heads) aware of the demands of the child-centred approach so as to effectively supervise and support their teachers.

It was found that 90% (27) of the teachers had not attended workshops or seminars to enlighten them on the demands of the child-centred approach and the Environmental Science syllabus. Only 10% (3) of the teachers had attended some form of workshops organized by subject committees at school level. From these findings it is evident that staff development workshops focusing on the child-centred approach as well as launching the science syllabus were not conducted at grassroots levels where the implementation takes place. These findings contradict observations in literature. Hargreaves (2005) for example, suggests that an innovation or a change in practice must be followed by educating teachers, on the demands and expectations of the new idea. Therefore from all these observations, it is apparent that infant school teachers in Masvingo Urban and Peri-Urban do not have adequate resources and support services to effectively implement the child-centred approach.

Regarding major constraints encountered by infant teachers when implementing the child-centred approach to teach science data reveal that there are the following constraints.

- *Large classes* are the first major constraint. On average these teachers have classes of 44 pupils except at Kyle school, a private school, which has small classes of between 12 to 20 pupils catering for large classes, 40 to 50 pupils, is strenuous to the teacher, and also makes it difficult to effectively implement the child-centred approach. Entwistle (1990) observe that implementing the approach is difficult with classes of 30 or more pupils.
- *Lack of sufficient resources and media* is the other major constraint faced by the teachers. The types of resources the teachers lack range from the new 1994 Science syllabus, Audio Visual Services (AVS) charts, teachers' resource books as well as pupils' text books on the new Environmental Science syllabus and money for field trips. This state of affairs, contradicts observations in literature in favour of the child-centred approach which argues that progressive methods cannot be effectively implemented with insufficient resources.
- *Lack of discipline or difficulty in instilling discipline* was also indicated as a major constraint. An analysis of these observations reveal that discipline is not the real problem, because during lesson observations, the researcher observed that what they considered to be a disciplinary problem is an effect of insufficient media coupled with the large classes. When there is insufficient media, children scramble for the little media that is provided. Also, infant teachers should realize that children at this stage are egocentric and each child sees everything provided as belonging to him/her. If viewed on the surface, this scramble for apparatus may be seen as a discipline problem. There are however, always the odd one or two pupils who may cause disciplinary problems in class.
- *Insufficient knowledge of the approach* by teachers was also identified as a major constraint. If the teacher does not have sufficient knowledge of the approach, it is not possible for such a teacher to implement it effectively. This problem is related to the lack of in-service courses, workshops and seminars on the demands of the child-centred approach and its practical implications in the classroom.
- Also, teachers indicated that the approach *is time consuming*. The issue of time consuming, is one of the disadvantages of the approach cited by (Nacino-Brown et al., 1994). However, advocates of the approach of the approach recommend the use of guided discovery as a solution to time consuming. Thus, the claim is an indication of lack of sufficient knowledge of the approach by the teacher.
- The last major constraint highlighted by the teachers is lack of a conducive environment. When the teacher encounters a lot of constraints, the classroom, environment ceases to be conducive to learning.

However, teachers have to realize that as the name Environmental Science denotes, some of the resources are available in the environment. It is the creative and adaptive teacher who can look around and utilize what is available. Basing on the findings of the study; infant teachers in Masvingo City encounter challenges when teaching science.

Possible solutions to constraints encountered by the teachers when implementing the child-centred approach in rank order were:

- First, the teachers suggested that the use of group work, *subject integration and resourcefulness* on the part of the teacher as measures which reduce the impact of the

constraints. By using group work, the teacher will be trying to break down this large class into manageable units as the teacher moves from addressing the whole class to individualized group instruction. This of course requires a creative teacher who is capable of integrating subject content. The teachers' suggestions are useful because of according to Reynolds (1990) an efficient and effective teacher should be adaptive, creative and should be a manager of available or improvised resources.

- *Second, is the reduction of the teacher-pupils ratio from 1 teacher to 40 pupils to manageable classes of say 1 teacher to 30 pupils.* This observation by the teachers is a realistic and practical solution since infant children need a lot of individual attention and constant help from the teacher. It is really straining for a teacher to cater for the needs and interests of 44 young learners within the time limits on the time-table. From the researcher's experience, the teaching day of infant classes, excluding break-time, is about three and half hours. Allocating that time to each pupil, in a class of 44, only allows for close to five minutes of direct contact with the teacher for all subjects. This is therefore not enough time for the teacher to be able to cater for the individual needs and interests of a particular child. Thus teachers resort to group work.
- *The provision of enough resources and media* was also highlighted as a possible solution by the teachers. As already observed above, it has to be emphasized that sufficient resources is one of the pre-requisites for effective implementation of the child-centred approach. A system should be developed where samples of media improvised by the teachers are forwarded to Audio Visual Service (AVS) for mass production so that all schools in the country benefit from the creation of innovative teachers. Although currently AVS has some financial constraints, the system should not only be developed but operationlised.
- *The holding of regular staff development workshops*, focusing on child-centred approach or on the launching of any innovation or change in the education system such as the Environmental Science syllabus, should be practiced. Since teaching is a dynamic skill, teachers can only keep pace with the demands of new pedagogical expectations through workshops and refresher courses. This also enables young and old, experienced and inexperienced teachers to interact and share professional ideas and practical innovations. In this study, the researcher observed that long experienced coupled with regular update workshops is an asset to the teacher and the education system. It is also healthy to the implementation of the child-centred approach, to have a balance between experienced teachers and teachers with little experience for cross-fertilization of ideas and a stable succession.
- *Teachers should fully prepare their work and understand the subject matter.* A fully prepared teacher is conscientious and stands at a higher operational level in the classroom than an unprepared teacher. Constant preparations enhance creativity and resourcefulness. Effective implementation of the child-centred approach requires such intrinsically motivated and hard working teachers.
- For those few pupils who cause disciplinary problems in the classroom, the teachers suggested that *discussing the problems with parents* may minimize or resolve such problems. Literature suggests that dialogue is important as a way of solving problems with

pupils in class by either approaching their parents or the pupils themselves. Locke for example, suggests that teachers should not use corporal punishment but should have dialogue or rationalize with the child. Similarly, advocators of the child-centred approach, encourage children to be responsible for themselves and the whole class in terms of discipline (Paterson, 1992). Therefore, from these observations, it is evident that infant teachers in Masvingo Urban and Peri-Urban have appropriate and practical solutions to constraints they encounter when using the child-centred approach. All that is left is for Standards Control Unit to tap these viable solutions and operationalise them.

- Lastly *there were significant disparities in terms of resources and the teacher-pupil ratio in the different schools*. Kyle school had very small classes ranging from 12 to 20 pupils in a class. This was testified by during an interview with a teacher at the school who openly stated that the school provides all the resources as requested by the teachers and they have small classes which allow to intimately interacting with the pupils. At Victoria, although they have enough resources, the large classes averaging 42 pupils, reduce the time spent between a teacher and an individual child. The situation is worse at Gwengavi, Rujeko and Don-Bosco where large classes of 44 are coupled with insufficient resources.

The findings of the study based on the research questions are: Most teachers have a theoretical knowledge of the child-centred approach. Teachers are academically and professionally equipped to teach Science using the child-centred approach. The general methods teachers used during lesson presentation were discussion, group work, question and answer; are child-centred methods, teacher-talk is not. Also the key child-centred method, discovery was not used by the teachers in the practical situation in the classroom. Teachers value the benefits of the child-centred approach because it enables them to know their pupils and be aware of their needs, it stimulates their interests and imagination, share ideas with children and it creates an environment where there is an interaction between the teacher and the pupils. Teachers do not have adequate resources and media to teach Science using the child-centred approach, except at Kyle School which is a private school.

Lastly, the study found that most ECD teachers lack a theoretical knowledge of the child-centred approach. The general methods ECD the teachers use to teach science are: discussion, group work, question and answer and teacher talk. The discovery method was not used by the ECD teachers in practical situations in their classrooms. It was found that there were significant disparities in terms of resources and the teacher-pupil ratio in the different schools. Kyle school had very small classes ranging from 12 to 20 pupils which allow them to intimately interact with the pupils. There were sufficient resources. At Victoria, although they had enough resources, the large classes averaging 42 pupils, reduce the time spent between a teacher and an individual child. The situation is worse at three schools where large classes of 44 were coupled with insufficient resources. When the infant teaches encountered a lot of constraints, the classroom environment seizes to be conducive to learning.

Recommendations

From the findings of the study, the following recommendations are drawn:

- Teachers should be knowledgeable of the child-centred approach and have enough resources in their science classes. There is need for continuous monitoring of the child-centred approach to ensure its effective implementation to teaching science in ECD classes.
- The reduction of teacher-pupil ratio from 1 teacher to 40 young learners to manageable classes of say 1 teacher to 30 pupils for infant classes should be effected, since infant children need a lot of individual attention and constant help from the teacher.
- A system should be developed and operationalised where samples of media improvised by some of the ECD teachers are forwarded to Audio Visual Services for mass production so that all schools in the country benefit from the creation of innovative teachers.
- Lastly, further studies are needed to investigate the conceptions of Teachers-In-Charge, Headmasters and Education Officers on the child-centred approach and how they manage its implementation in schools.

Conclusion

This study was an investigation into the infant teachers; conceptions of the child-centred approach, the strategies they adopted to implement it and the problems/constraints they faced when teaching science. The literature review revealed that there are two schools of thought, those for the child-centred approach and its critics. The proponents associate the term child-centred approach with learning through experience, active learning, interactive teaching/learning, problem-solving, discovery learning, participatory approaches to teaching/learning and the play way method. On the other hand, the critics of the approach claim that the approach is difficult to implement with insufficient resources, large classes of thirty or more pupils, limited teacher expertise and limited teacher competence. Findings in this study confirmed both views. Teachers in the study regard the concept of child-centred approach as superior to other approaches and that it is beneficial to both teacher and pupils in classroom practice. However, for the approach to be effectively implemented, the constraints highlighted by the critics should be minimised as much as possible,

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Corresponding Author

Dr Rose Mugweni
Great Zimbabwe University Zimbabwe
Email: ro.mugweni@gmail.com

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