Pre-primary School Teachers' Perspectives on the Characteristics and Quality of Materials for Teaching Literacy and Numeracy in Tanzania Preschools

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Abstract

Characteristics and quality of teaching and learning materials facilitating early literacy and numeracy skills acquisition has had hardly attracted focused research in Tanzania. Yet it is recognised that the success young children's learning is engendered by their access to high quality materials, which are essential for active learning and serve as a prerequisite for successful teaching and learning of literacy and numeracy in early childhood settings. It is against this backdrop that this study was conducted by involving four experienced female teachers as key informants to share their rich experiences in establishing characteristics and quality of literacy and numeracy materials. These key informants engaged through face-to face semi-structured interviews were purposively sampled using homogenous sampling. Although quality in education is not a cross-border concept, quality materials for teaching and learning literacy and numeracy skills should generally be safe, clean, age-appropriate, engaging for the learners, complete and meaningful, locally available, and culturally sensitive. Therefore, Early Childhood Practitioners (ECP), education planners and decision-makers should ensure that materials are properly selected, are readily available, accessible and utilised for the best results in learning to be attained.

Keywords: Quality, Literacy, Numeracy, Active Learning, Materials.

Introduction

Acquisition and development of literacy and numeracy skills among young children constitute a priority issue for the policy-makers and practitioners in the world today. Indeed, countries have increasingly placed the acquisition and development of literacy and numeracy skills among young children at the centre of respective countries' interests than ever before (EFA Global Monitoring Report, 2006). Literacy and numeracy skills have attracted renewed attention because of empirical evidence from researchers (Taguma, Litjens, & Makowiecki, 2013; Touhill, 2013) and the International Policy Guidelines (EFA Global Monitoring Report, 2006) show a positive correlation between these aspects on children's learning and their families' well-being. In addition, literacy and numeracy are key aspects of quality of education (EFA Global Monitoring Report, 2006; Taguma *et al*., 2013). As such, access to quality early childhood education [ECE], mainly through literacy is a fundamental human right (Flewitt, 2013; EFA Global Monitoring Report, 2006). Moreover, literacy and numeracy have been the focus of practitioners and policy-makers as such skills begin early, following children's birth (French, 2013; Touhill, 2013; Raban, 2011). Therefore, investing in early education programmes would have large long-term monetary and non-monetary benefits (Heckman, 2006). More significantly, promoting literacy and numeracy in early grades is crucial as Montessori (1967) posits that this period is a sensitive one, which when lost makes it hard to recover.

Soares (1992) asserts that literacy is a controversial concept to define as it depends on culture, time (past or present), economic status, political and other factors. Traditionally, literacy was conceptualised as being able to speak, read, and write. In the modern era, literacy has evolved into the ability to identify, understand, interpret, create, communicate, compute, and use printed and written materials associated with varying contexts (UNESCO, 2013). Bourdieu (1977) refers to literacy as a cultural capital because it differs within the social and cultural context in which it is learned and explained. This conceptualisation implies that literacy entails the ability of the learner to participate effectively in literacy activities for success in both the home and school contexts. Looking at the views of the writers on literacy, one could establish that literacy means understanding or decoding texts to the level that an individual pupil or learner uses such developed decoding skills to communicate, and learning other contents of similar structure at the same or above level of schooling. Though there are variations in defining literacy, Soares (1992) categorises literacy definitions into individual and social dimensions.

Literacy involves extracting meaning from written numerals and simple formulas (recognising that three is larger than two) and knowing to write (Chabbott, 2006), searching for meaning in stories, books and stories, technological and cultural aspects (Whitehead, 2007). Chabbott (2006) identifies two components of literacy. The first component is pre-literacy which involves understanding the sound of speech commonly referred to as phonological awareness or oral language, print awareness, and alphabetical knowledge. These skills are acquired through parental or caregivers' involvement in reading with their children at home or in pre-school. The second component of literacy has to do with early literacy or emergent literacy. Chabbott (2006) describes early or emergent literacy as involving phonics (relating spelling practices and speech sounds), phonemic awareness (dividing words into phonemes), fluency, vocabulary, and text comprehension.

Just as literacy is a multi-faceted concept (Soares, 1992), numeracy shares the same characteristic (Doig, McCrae, & Rowe, 2003). Indeed, this feature is reflected in the diverse definitions used to define numeracy. Doig *et al*. (2003) and the Department of Education and Skills [DES] (2011) define numeracy as the effective use of mathematics to meet the general demands of life at home, school, in paid work, and participation in community and civic activities. The DES on its part notes that numeracy skills helps children think and communicate quantitatively, make sense of data, have spatial awareness, understand patterns and sequences, and recognise situations where mathematical reasoning is applicable to solve problems.

In practice, Epstein (2007) asserts that numeracy involves identifying the language of mathematics by singing number rhymes (one, two, etc), fitting objects by their sizes (smaller objects inside the bigger objects), learning that some things are the 'same' whilst others are 'different', and experiencing going 'faster' or 'slower'. It also involves recognising patterns, sorting objects, talking about time and the patterns of the day, measuring and calculating amounts, arranging objects in space, and identifying shapes (Touhill, 2013). Stretch (2009)

describes numeracy learning as involving counting, classification, sequencing or serialisation, and geometry. In general, the author argues that children are exposed daily to numeracy practices by their parents/caregivers during shopping, through shapes of various objects or materials, numbers of things or ages, and sequences. Numeracy, therefore, entails understanding and applying concepts, the relationship (large or small, order, tall or short, etc) between objects/things/numbers, and monetary values to communicate and solve problems related to it.

Engagement of early learners in literacy and numeracy is advantageous for early learners. In this regard, Touhill (2013) and UWEZO (2011) observe that such skills are essential in paving the way for modern life or further learning as they are essential tools for basic education. Moreover, access to further learning enables learners to fight poverty (EFA Global Monitoring Report, 2006). Furthermore, Touhill (2013) asserts that literacy and numeracy help early learners to present and share information with others about the world they live in. In connection with this learning process, Worthington (2008) identifies the classroom environment as one of the most basic and necessary of the three elements that engender effective learning among children. The other two elements are teachers' awareness of the elements of language development (phonological and phonemic awareness, valuing children's first language, and sequence of language acquisition); and teachers' awareness and use of various strategies in the teaching and learning process. Researchers such as Worthington (2008), and Reutzel, Oda and Moore (1989) have established that effective and meaningful classroom environment should contain a created rich print environment with learning areas.

This study was designed to establish experiences of the pre-primary school teachers on the characteristics and quality of teaching and learning materials in engendering literacy and numeracy. Empirical evidence and the national policy document of 2014 (Ministry of Education and Vocational training-MoEVT, 2014) helped to establish the usefulness and characteristics of supportive materials than engender meaningful learning in PPE. In addition, practitioners' voices and experiences were necessary to be explored.

Characteristics of Materials

Specifically, Gerdes, Durden and Maning (2013) classify materials with their purpose into two categories of literacy and numeracy development, arguing that, literacy materials should have the following characteristics:

i) Allow children to label and the teacher (s) to type in the classrooms;
ii) Be storable and easily accessible to the children at all times (poetry books, storybooks, books without words, and books for concepts and vocabulary); and
iii) Be ideal for writing and drawing new stories available in learning areas (white boards).

Gerdes *et al*. (2013) and the Ontario Ministry of Education (2005) identify characteristics of numeracy materials: They should be concrete (real and pretend money, weighing scale, cards).

Gerdes *et al*. (2013) insist that the use of weighing scale on objects make children participate in weighing materials and understand weight and balance. Meanwhile, the use of real or 'pretend' money makes children understand the value of money and practice using it. Doig *et al*. (2003), citing Frigo (1999), calls for the deployment of materials developed for classroom use in numeracy skills acquisition that are culturally sensitive and appropriate. In addition, these materials including the teacher's handbook should be comprehensive, accurate, in-depth and meaningful without trivialising indigenous cultures and beliefs. Elaborating further, Gerdes *et al*. (2013) asserts that materials should be non-standardised (sticks, string, and rulers) for facilitating the understanding of concepts such as tall, short, big, and small. The non-standardised materials could be treated as found materials. Touhill (2013) identifies other found materials for application in the acquisition of numeracy skills as shells, seeds or leaves that are important in encouraging mathematical thinking and in using mathematical concepts and language.

Quality of Materials for Meaningful Literacy and Numeracy Learning

It is also universally accepted that teaching and learning materials for literacy and numeracy should be of high quality. In this regard, Neuman and Roskos (1990) and Morrow (2007) highlight essential qualities of the materials that are appropriate for young learners. The materials need to be natural and safe to use by young children. As a matter of fact, natural materials are easily accessible, plentiful, and often free (Hohman & Weikart, 1995). Furthermore, these materials should be authentic. According to Morrow (1996), authentic materials are those which are concrete, those which grab the young children's attention and sustain their interest in learning activities, create a community of learners, and are aesthetically pleasing. To be authentic, such materials should be real items and common to the child's environment (Morrow, 1996, 2007).

The materials that can facilitate meaningful literacy and numeracy learning include different types of writing materials such as papers, books, pens, and pencils with different colours; building materials such as cob or "gunzi" in Kiswahili, sand and scissors; the materials such as stones for numeral concepts, boxes of different sizes for shape and organisation. Another quality of the materials is utility. Such materials should be useful to children in their imitative attempts (Neuman & Roskos, 1990). Moreover, the materials should also offer children and adults opportunities to read them out aloud. The reading aloud with adults makes the child develop new vocabulary and print awareness (Gersten & Jimenez, 1998). Furthermore, Morrow (2007) asserts that materials should serve various purposes, particularly multiple functions and, more significantly, they should easily be understandable to the learners. These quality materials, according to Morrow (2007), should be used in the teaching and learning science, mathematics, art, and music.

Theoretical and Empirical Stances

The current paper was informed by the theoretical ideas by Lev Vygotsky (1978) on the importance of authentic situations in developing children's literacy and numeracy, and in the development of higher mental functions such as reading, writing as well as problem-solving

(Doolittle, 1991). Building on Vygostky's views, Fernie (1985) argues that authentic situations characterise classroom size, intimacy of setting, and the material resources are essential in achieving high quality learning outcomes among young learners. These aspects can effect differences in the quality of children's pretend play, social interaction and constructive activities. In addition, Elder and Pederson (1978) argue that as young children interact with objects in the settings they are familiar construct meaning from the experiences during play.

Conceptually, it can be deduced that developing a child with ability to solve problems and able to read and write would be possible and easy given that there materials and enough space for the interaction. This implies that resourced learning environment with enough and safe learning space, and attractive learning environment are key inputs in stimulating positive development of literacy and numeracy skills to the child.

Methodology

Qualitative multiple case study design was employed in which four teachers from the public pre-primary schools and one programme manager and a teacher of Catholic schools were involved in face-to-face semi-structured interviews for primary data sources. Three of the four pre-primary school teachers taught in different schools. One was from a demonstration school of the Katoke Teacher's College in Bukoba, the other teacher happened to teach different pre-primary schools in Mbeya and Martin Luther in Dodoma, and the other was a teacher working in Mkuranga district. The involvement of these teachers was facilitated by their presence in Dodoma municipality while undergoing professional development at the University of Dodoma. Moreover, the researcher knew them in terms of their work experience in the pre-primary field. The fourth teacher worked with the Arusha Arch-diocese, which is a Non-governmental Organisation (NGO). These four experienced female teachers were purposively sampled via a homogeneous technique for them to share their enriched experience in the field in developing pre-primary scholars with numeracy and literacy skills. This design was employed for both literal and theoretical replication (Yin, 2003). Documentary analysis was conducted for secondary data sources from published research papers, international and local policy guidelines, and online resources. Semi-structured interviews, on the other hand, were used to collect primary data.

The data collected were then subjected to Miles and Huberman's (1994) analytical framework following the three steps of data reduction, data display and conclusion drawing or verification. That is to say, all the data collected from primary and secondary data sources were read and re-read for the researcher to develop meaning out of such data before they were transcribed from the language used during data collection, from Kiswahili into English language. Thereafter, data were organised based on the study purpose and specific objectives of the study.

Findings

The analysis of the collected data and subsequent presentation in accordance with the four sub-themes-strategies for facilitating literacy and numeracy acquisition; materials used; characteristics of the materials; and the quality of the useful materials.

Learning and Teaching Strategies

Through interviews with experienced pre-primary school teachers, the study established that teachers basically used a variety of materials to develop children's competency in prints, word formation, syllable awareness, some numeral concepts, sports, and science. Teachers reported having used varied activities and materials to facilitate the attainment of the best results in the teaching and learning process for young children. The informants interviewed said that they used songs, play, imitation or rehearsal, and demonstration as strategies for accomplishing teaching and learning activities. These activities were deployed by the teachers to make the learning process more interactive. In fact, the activities identified by the study participants are conducted in pre-primary classes to make young learners enjoy their presence in schools and particularly in class. As learners begin to like or love the schooling, one of key respondents explained:

> Songs carrying some messages on the greetings, cleanliness, or counting make children active participants in the learning session. Moreover, they make them develop some vocabularies through the songs they sing. In one way or another, songs make our learners remember the content through singing, hence prepared for the primary school (Teacher D, Interview: 26th June, 2015).

Respondents also reported that singing, play, and rehearsal helped to transform the home behaviours of the young children to suit the school environment. Songs and play activities in schools in the guidance of teachers occasioned a shift from the use of the vernacular language to the formal language and modern life in schools through interaction. In Tanzania, this has been made possible through Kiswahili, the national language, in which most of these activities are conducted in non-English medium schools that dominate the public pre-primary schools landscape. The teachers interviewed underscored the fact that learning in pre-primary classes was supposed to be interactive, joyful and enjoyable. From the teachers' perspective and the actual practice in the pre-primary field, joyful learning sessions attracts children to the school and increases the retention rate, hence forestalling issues of dropping out.

Materials Used to Facilitate Learning and their Characteristics

The analysis of the teachers' responses revealed four major types of materials that were found to be used in teaching and learning literacy and numeracy. These materials included real things, models, charts, and cards. In their classification, teachers identified real things used for teaching and learning numeracy to include: i) stoppers commonly known as "vizibo" in Kiswahili, ii) some plastic materials from industries, iii) fruits (mangoes, apples, etc), iv) cards, v) chalkboard, vi) abacus, and vii) stones. Meanwhile, charts with alphabetical letters, drawings/picture books, and cards were found to be useful in teaching and learning literacy skills. In fact, the use of these materials depended on their characteristics and quality. The study established the following characteristics of materials as essential for teaching and learning literacy and numeracy. In all, the analysis revealed seven major characteristics of the materials for teaching and learning literacy and numeracy. These characteristics were adequate and age appropriate; affordable; readily available in the environment; durable and safe; stimulates learner's senses and interests; varied in forms; and visible to all learners.

Of particular interest is the fact that teaching and learning materials should be easily seen by the majority of the learners in given learning context. In this regard, the teachers during the interviews related the visibility of the materials with class-sizes as most of the classes accommodate an average of 70 to 120 learners in one room. They insisted that children learn best as they can see, touch, taste and even smell. Therefore, it is advisable that teachers or caregivers use materials which visible. When young learners see the objects or materials being used in the learning process, this approach stimulates learners' thinking over the material and engages them through questioning. One of the informants, a co-ordinator for ECE in Arusha Arch-diocese, said that the materials are designed to facilitate children's learning. Therefore, the teacher should prepare materials for the learners' use and not just for the use by the teacher.

The other characteristic was that materials should attract learners. From the experiences of the teachers, it was established that attractive materials were appropriate and vital in engaging children in learning. Based on the teachers' experiences of working with young children, the use of attractive materials during teaching and learning stimulates young children in a way that they would like to touch and play with. Therefore, the selection and use of different colours and of interest to children was widely emphasised by the informants. They argued that materials should be well-decorated for drawing the attention and curiosity of the learners. Also, the selection of colours for decorating/painting by the teacher is of great importance as some children tend to have poor visibility and do not attract learners because of poor or faint colours on some materials or charts. They identified blue and black as some of the dull colours that fail to make materials sharply stimulating.

The third characteristic of the materials for teaching and learning literacy and numeracy is that they should be safe. Safety of materials for teaching and learning literacy and numeracy was found to focus on avoidance of sharp edges materials (i.e. nails, pencils, glass), thermos, tablets and any other harmful or toxic materials. The teachers discouraged the use of these materials. They insisted that young children like to play as part of their life. Therefore, exposing them to the learning context with harmful materials or objects was like pouring petrol into a burning fire as doing so could lead to an explosive inferno that is difficult to control. Teachers held this view as experience indicates that some children are more aggressive than their peers. Thus, having such materials in the classroom is a recipe for disaster for the children who play with them or to the playmates. As such, it is appropriate that materials be safe and easy for the learning children to handle and play with. Indeed, the use of safe materials in the contexts where schools are located too far from the medical services would significantly help to keep teachers and parents comfortable and relaxed as they would not be worried about the learners' safety-related problems or becoming victims of unnecessary mishaps. As one of the teachers interviewed explained:

> The use of breakable materials such as glass can cause harm to the children during learning. Thus the teacher and learners should use materials which cannot bring tensions in the learning process as free play make children allow them to explore the materials and the world well (Teacher A, Interview: 26th June, 2015).

This implies that the teaching and learning environment should be equipped with the materials which are safe for the child to handle and play with. On the other hand, the use of harmful

materials would expose both teachers and learners to unfriendly, unwelcoming and entirely ineffective learning atmosphere that could also have the undesired effects of endangering their lives. Indeed, it is through having an attractive and safe learning environment that a child and peers would freely interact with the material or themselves.

Another important characteristic of the materials is that they should be readily available in the school or home contexts. Informants held the view that pre-primary classes are there to bridge the gap or provide the continuity between the school and children's home contexts. Thus, the use of materials which are not commonly found in their environment would make the children's learning tiresome and unfriendly in addition to making it difficult for them to relate with those materials. Materials such as sand, cereals, leaves and stoppers are widely available in the children's contexts. Using them in the teaching and learning process tends to facilitate the learners' transfer of knowledge and experience gained in the learning process to different social contexts where they can apply the knowledge and experience acquired to solve problems they encounter. Moreover, the use of real materials which are found in the learners' environment helps learners build relationships amongst themselves and with teachers. The positive relationship that could exist between the learners and the teacher would make the two become co-operative and, hence, solve learning problems that exist in and outside the school contexts.

A teacher and a programme manager for pre-primary school programmes in the Arusha Arch-diocese, exemplified thusly:

> In different cultural contexts, there are unique materials such as fruits or plants which could be used in facilitating numeracy and literacy learning. The use of such materials would make learners feel and benefit from them. In remote areas, for example, it is difficult to find industrial glue, but the teacher can use local glue from some plants available in the context to improvise materials for the teaching and learning process (Teacher B, Interview; 29th June, 2015).

She further noted that, as it was also difficult to find boards for learners to use, a teacher in collaboration with learners and parents could substitute them with used carton boxes to facilitate smooth teaching and learning of numeracy and literacy. She explained that boxes and glue made locally from plants and seeds could be used to create letters and numbers for teaching and learning to take place meaningfully. Materials should also be readily available not only when fetched outside the school environment, but also accessible at any time for use in class by the learners. This is to say that they should hang or stored in a place where learners could use them easily.

The other characteristic is that the materials should be affordable. The teachers interviewed explained that local schools or homes are surrounded by a variety of materials which could used to facilitate learning and make it meaningful and enriching to the learners. Low or no cost materials make teachers and learners conduct their learning with minimal or no costs because public pre-primary education (PPE) does not independently receive grants for purchasing such learning materials. Usually it is the primary schools to which they are appended that receive funding, from the government, though limited. Through the use of affordable materials, teachers can carry out teaching and learning activities as the majority of these teachers were

paid through token monetary contributions made by parents or caregivers with children in pre-primary classes. Indeed, these pre-primary teachers are not normally on the government payroll.

Furthermore, the materials for teaching and learning literacy and numeracy need to be adequate enough to fulfil the needs of the number of children or learners in a particular class or school. The informants insisted that learning in the PPE is so individualised that having an adequate number of learning materials should be the norm not the departure. In fact, having inadequate materials in a class would force learners to share or reduce some learners into mere spectators or observers rather than active learners they are supposed to be. This situation tends to limit the development of learners' talents/capacities. When this happens, the materials become barriers to learning not facilitators. At the centre of the emphasis by teachers is that the teaching and learning materials in use should be developmentally appropriate. In this regard, teacher A explained:

> It would be surprising that a teacher uses a computer as an aid to teach about a computer and its functions to young children. It would surprise me because the material itself is uncommon in most of the Tanzanian families and rural areas. This is so because using a computer in facilitating literacy and numeracy makes learning appear beyond children's ability by many local Tanzanian standards (Interview; 26th June, 2015).

Therefore, adequacy, ease of access and age-appropriateness are essential features worth considering when selecting or designing materials for use in PPE. When materials match with the number of young learners they help create a learning environment that could make learners focus their attention on them instead of looking for something else to supplement the learning session. Also, the teachers cautioned that young learners are sensitive to feelings of discrimination, and thus can easily lose interests in schooling and the teacher altogether.

More significantly, the teaching and learning materials should be of a variety for teaching and learning of literacy and numeracy skills to take place effectively. The informants insisted that the use of the same materials all over again and again in the daily teaching and learning of literacy and numeracy would become monotonous and make learners become bored and cease to take part actively in the learning process. Therefore, materials of different varieties could be used to facilitate the achievement of the best results in learning as learners have different interests in colours and texture of materials. In fact, the teachers were adamant that the use of the same material for teaching different concepts of various learning activities could prove counterproductive.

Quality of Materials

The analysis of the teachers' responses revealed six major qualities of materials suitable for teaching and learning numeracy and literacy in pre-primary classes. These materials should be durable and safe; locally found; visible and stimulating; complete and meaningful; and culturally-sensitive. The teachers were unanimously in favour of durable and safe materials. They explained that it was important for those involved in the teaching and learning process to select and use materials, which could not easily break or get destroyed by the learners and that

they could also use for later lessons. Teachers insisted on the use of durable materials, arguing that the ECE curriculum stresses the application of learner-centred approaches facilitated by the use materials that can facilitate learning. Therefore, materials should be handled, touched, tasted and even smelt by the learners. Fragile materials or objects do not only have a short shelf-life but they could also be a source of frustration for both the teacher and the learners, particularly so for the latter. Furthermore, the informants insisted that the learning materials used should be clean and safe as well as child-friendly so that they do not put a child in harm's way.

More significantly, the materials for young learners should be visible and stimulating. In other words, using materials lacking visibility would make children struggle to identify let alone understand the figure or object being represented. This also explains why even the colours used should be those which attract the learners' attention or make them curious. On the whole, high quality materials were perceived by pre-primary school teachers as those which could be used in the teaching and learning of multiple concepts. Teachers referred to this quality as of multiple uses. They discouraged teachers from designing materials which could be used just for a single theme and later discarded after being found to be of no further use in facilitating effective learning. In this regard, teacher C explains:

> Some teachers design teaching and learning materials whose use value ends with the conclusion of the lesson period because of their poor knowledge and skills on materials designing. Lack of expertise in material designing thus becomes a major reason behind the inadequate availability of materials in our pre-primary classes (Interview; 25th June, 2015).

Though the informants admitted that material designing requires teacher's creativity, they insisted that lack of creativity should not be an excuse for lacking improvisation due to the importance of materials in the teaching and learning of literacy and numeracy. They reported that teachers, whether certified or uncertified, should develop the capacity to design and appropriately use materials to facilitate the children's active learning. Also, the designing of materials for a multiplicity of uses was strongly encouraged by the teachers as such materials opened up the potential of enriching the sensorial experiences as well. They exemplified that a doll could be used in teaching and learning literacy (vocabulary), but it could also be used to teach a concept of the numbers (one, two, etc). It indicates practically that teachers should design and ensure they use materials and mostly the locally available for the child to learn meaningfully by playing with it freely or with minimal assistance of the instructor. Teachers should also develop co-operative working environments among themselves so that they share experiences for enriching pre-primary classes with materials for children's self-choice. Through co-operative working environment, teachers—both of the lower grades and those for pre-primary—would develop and enhance their creativity.

The other quality of the teaching and learning materials that emerged in the study was that the materials should facilitate the occurrence of meaningful learning at the level of the pre-primary curriculum, which should be appropriate enough to cultivate children's interests. As a matter of fact, young children learn best when their interests are taken into account. In this regard, the informants insisted on careful consideration and understanding of the learners' interests in

relation to the materials the teacher uses in class. For instance, a teacher intending to use a picture of a human being but s/he decorates that picture in blue colour is inappropriate as there is no normal person who is blue in colour. Such material does not match it with the children because there is a disconnection between the material and the reality of the young learners. Another key respondent explained that when a picture of a certain animal is to be used, whether moulded through clay or created through wooden materials, it should reflect and really represent such animal.

Cultural sensitivity was also identified as a crucial quality of the materials for administration with the young learners. Teachers asserted that, as children come from varied cultural backgrounds, teachers ought to factor in this aspect to ensure that they are sensitive to the varied needs of the learners. In designing materials for facilitating meaningful teaching and learning of literacy and numeracy, consideration of varied background is an essential determinant that teachers for pre-scholars can ignore at their own peril; they need to consider this factor to so that learners can benefit to the optimum from the session. Explaining, teacher B said:

> It is inappropriate for the teacher to use a model or a picture of material such as boats or ships in situations where children have no such prior experience with them. A teacher should, therefore, consider using another material which could serve the intended learning purpose by replacing the use of boats or ships with appropriate substitutes (Interview; 29th June, 2015).

The informants insisted that the use of culturally irrelevant materials would disconnect young learners from the reality, hence undermining their learning. Thus, it is advisable and appropriate to use culturally relevant materials to help learners acquire and develop requisite skills that would transform them into problem-solvers. Therefore, using appropriate materials that fit into a particular culture would help learners easily transfer and apply the skills and competencies acquired in their surroundings.

Discussion

Strategies employed by teachers involved in this study in developing learners' literacy and numeracy skills are in line with foreign experiences. Researchers such as Kostelnik, Soderman and Whiren (2007), and Moss and Fawcett (1995) acknowledge that the use of songs, rhymes, and finger play facilitate the acquisition of literacy and numeracy skills among young children. Indeed, they argue that literacy and numeracy activities support and enhance language and literacy acquisition in children.

With regard to the characteristics of the materials useful in preschools' meaningful learning, teachers involved in this study perceived negatively black or blue colours. The pre-primary school teachers had a negative view on the use of black and blue colours in making drawings for classroom instruction and learning. On the other hand, Pairman and Terreni (2001) dismiss bright colours as the worst for materials meant for young learners. They report that too many bright colours could distract children and agitate them or even shut down their senses. Despite Pairman and Terreni's (2001) opposition to the use of bright colours, Stretch (2009) insists that

children love bright colours, particularly those which are attractive and inviting. Even then Pairman and Terreni (2001) appear to be more concerned about over-use of bright colours rather than dismiss them altogether as useless. After all, at the end of the day, the use of stimulating and visible materials activates the children's senses and helps them enjoy their learning and the environment (Lovejoy, 2014).

The issue of cultural sensitivity when using materials is at the centre of children's learning in ECE (Irwin, Siddiqi & Hertzman, 2007; Serpell, 2005; Bredekamp & Copple, 1997; Vygotsky, 1978). Empirical evidence by these authors show that the use of culturally relevant materials serves as an indicator of the quality and effectiveness of a given PPE programme in that particular context. Vygotsky (1978) is even more explicit by aptly noting that teaching should be organised in such a way that the reading and writing for young learners are necessary for something and "relevant to life." This theorist treats relevance of learning as authentic situations which whole activity would help establish the environment in which the zone of proximal development is embedded. Once this happens, the teachers will have provided the young children with an enabling environment that enriches their learning experience in literacy and numeracy.

Conclusion

Experiences drawn from the literature reviewed and the empirical findings that of teachers in PPE on the characteristics and the quality of teaching and learning materials for literacy and numeracy have a number of indications. First, there is similarity when it comes to the nature/characteristics and the quality of the materials teachers should use in facilitating the learning of literacy and numeracy in pre-primary classes. However, technology has differentiated the Tanzanian experience from the practices in the West as it is used for teaching and learning numeracy and literacy. Secondly, the selection or designing and availability of the materials for use in learning numeracy and literacy in pre-primary classes should focus on the appropriateness, visibility, best interests of the child, cultural values, and safety for the active use and enjoyment of the learning child.

Thirdly, in the view of Pairman and Terreni (2001) that physical environment should be well-organised by those involved in the teaching and learning of the young children to ensure the aesthetic (provision of materials and equipment which are sensory rich) of the third teacher. This could be done by organising the learning environment into activity areas, observe sense of orderliness of the materials, places for storing and displaying materials, and having friendly structures to the child.

Fourthly, it is also important that practitioners (teachers) and decision-makers ensure the availability of high quality and appropriate use of materials in the learning of pre-primary school children. Otherwise, the teaching and learning of numeracy and literacy would not result in the desired results for the young learners. As Montessori (1967) insists, "I hear and I forget, I see and I remember, and I do and I understand." This is a maxim that teachers of pre-school children need to enshrine in their hearts. And yet, a print rich environment leads to the dramatic activities and vice versa (Neuman & Roskos, 1992).

Practically, it is the expectation of the researcher and other education stakeholders that findings of this study would result in long-term initiatives by the pre-primary teachers and education authorities immediately from the school to the ministerial level to improve and enrich the learning environment for the benefit of all enrolled children. Improving the learning environment would also make learning in the pre-primary class more concrete and meaningful. Significantly, organising and implementing learning activities in pre-primary class using concrete and relevant materials would make children develop concepts in addition to figuring out things, hence promoting child's higher mental functions.

Theoretically, the findings align with the theoretical propositions paused by the Lev Vygotsky on creating and ensuring that the learning environment fosters the development of higher order thinking through authentic situations. Furthermore, teachers' perspectives on the quality and characteristics of materials for teaching and learning literacy and numeracy in pre-primary class add to the existing understanding of the concept 'authentic situations' through their views that materials used should be plentiful, safe, durable and affordable.

References

Anders, Y., Rossbach, H-G., Weinert, S., Ebert, S., Kuger, S., Lehrl, S., & Maurice, J. V. (2011). Home and preschool learning environments and their relationship to the development of early numeracy skills. *Early Childhood Research Quarterly, 27, 231-244.*

Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge: Cambridge University Press.

Bredekamp, S., & Copple, C. (Eds.) (1997). *Developmentally appropriate practice in early childhood programs (Revised edition).* Washington, D.C.: National Association for the Education of Young Children.

Chabbott, C. (2006). *Accelerating early grades reading in High Priority EFA Countries: A desk review.* American Institutes for Research under the EQUIP1 LWA. Accessed at http://www.equip123.net/docs/E1-EGRinEFACountriesDeskStudy.pdf on 21/6/2015

Department of Education and Skills. (2011). *Literacy and numeracy for learning and life: The National strategy to improve literacy and numeracy among children and young people 2011-2020*. Dublin: Department of Education and Skills. Accessed at http://www.education.ie/en/Schools-Colleges/Information/Literacy-and-Numeracy/Literacy-and-Numeracy-Learning-For-Life.pdf on 21/6/2015

Doolittle, P. E. (1991). *Vygotsky and the socialization of literacy.* Hammond, LA: Southeastern Louisiana University.

EFA Global Monitoring Report. (2006). *Education for all: Literacy for life*. Paris, France: UNESCO.

Doig, B., McCrae, B. & Rowe, K. (2003). *A good start to numeracy: Effective numeracy strategies from research and practice in early childhood*. Canberra: Commonwealth of Australia.

Elder, J., & Peterson, D. (1978). Preschool children's use of objects in symbolic play. *Child Development*, *49*, 500-504

Fernie, D. (1985). The promotion of play in the indoor play environment. In: J. L. Frost & S. Sunderlin (Eds.), *When children play* (pp, *285-290*). Wheatson, MD: Association for Childhood Education Information

Frigo, T. (1999). *Resources and teaching strategies to support Aboriginal children's numeracy learning: A review of the literature*. Sydney, NSW: NSW Board of Studies.

Gandini, L. (2002). The story and foundations of the Reggio Emilia approach. In V.R. Fu, A.J. Stremmel, & L. T. Hill (Eds.), *Teaching and learning: Collaborative exploration of the ReggioEmilia approach* (pp.13-21). Upper Saddle River, New Jersey: Merrill.

Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: Interviews and focus groups. *British Dental Journal*, *204* (6), 291-295.

Government of South Australia. (2004). *Choosing and using teaching and learning materials: Guideline for preschools and schools*. Hindmarsh, SA: Department of Education and Children's Services, The State of South Australia.

Hall, C. (2013). *Implementing a Reggio Emilia inspired approach in a mainstream Western Australian context: The impact on early childhood teachers' professional role*. A publishedMasters Dissertation, Edith Cowan University.

Hohmann, M., & Weikart, D. P. (1995). Educating young children: Active learning practices for preschool and child care programs. *A curriculum guide from High/Scope Educational Research Foundation.* Michigan: Ypsilanti.

Irwin, G., Siddiqi, A., & Hertzman, C. (2007). *Early childhood development: A powerful equalizer.* A report for the World Health Organization's commission on the social determinants of health. HELP. University of British Columbia.

Kostelnik, M. J., Soderman, A. K., & Whiren, A. P. (2007). *Developmentally appropriate curriculum: Best practices in early childhood education* (4th Ed.). Upper Saddle River, NJ:
Pearson Education, Inc.

Lilly, E., & Green, C. (2004). *Developing partnerships with parents through children's literature.* New Jersey: Pearson Merrill/Prentice Hall.

Lovejoy, C. (2014). *Literacy instruction in three preschool programs: A multiple case study*. A published doctoral dissertation, Walden University.

Ontario Ministry of Education. (2005). *A guide for effective instruction in mathematics: Kindergarten to Grade 3: Geometry and spatial sense* Ontario: Queen's Printer for Ontario. Accessed at http://www.eworkshop.on.ca/edu/resources/guides/Guide_Math_K_3_GSS.pdf

Montessori, M. (1967). *The discovery of the child.* New York: Ballantine.

Moss, B., & Fawcett, G. (1995). Bringing the curriculum of the World of the home to the school. *Reading and Writing Quarterly: Overcoming Learning Difficulties, 11*, 247- 256.

Morrow, M. L. (2007). *Developing literacy in preschool.* New York: The Guilford Press

Morrow, L. M. (1990). Preparing the classroom environment to promote literacy during play. *Early Childhood Research Quarterly, 5: 537-554*

Neuman, S. B., & Roskos, K. (1992). Literacy objects as cultural tools: Effects on children's literacy behaviors in play. *Reading Research Quarterly, 27, 202-225.* Accessed at https://steinhardt.nyu.edu/scmsAdmin/media/users/sn1150/LiteracyObjects.pdf on 28/6/2015

Pairman, A., & Terreni, L. (2001). *If the environment is the third teacher what language does she speak*? Accessed at http://www.educate.ece.govt.nz/~/media/Educate/Files/Reference%20Downloads/oldECE/environmentsconference.pdf on 29/6/2015

Reutzel, D., Oda, L., & Moore, B. (1989). Developing print awareness: The effect of three instructional approaches on kindergartener's print awareness, reading readiness, and word reading. *Journal of Reading Behavior, 21*: *197-217.*

Serpell, R. (2005). Optimising the developmental consequences of education: Reflections on issues by Michael Cole. *Human Development, 48, 217-222.*

Shukia, R. (2014). Learning and teaching to read in Kiswahili in pre-primary classes in Tanzania: Teachers' beliefs and instructional practices. *Published PhD thesis, Department of pedagogy Linnaeus University.* Sweden

Soares, B. M. (1992). *Literacy assessment and its implications for statistical measurement: Current surveys and research in statistics*. Brazil: The Federal University of Minas Gerais. Accessed at http://unesdoc.unesco.org/images/0009/000928/092880EB.pdf on 21/6/2015

Stretch, L. (2009). The effects of cognitive stimulation in the development of mathematics, literacy and life skills concepts in early childhood. *A published Masters' of Science Dissertation*, University of South Africa.

Touhill, L. (2013). Play-based approaches to literacy and numeracy. Early Childhood Australia. *NQS PLP e-Newsletter Number 66, 1-3.*

Trudell, B., Dowd, J. A., Piper, B., & Bloch, C. (2012). *Early grade literacy in African classrooms: Lessons learned and future directions.* Tunisia: Triannale on Education and Training in Africa-ADEA

UNESCO. (2008). International literacy statistics: *A review of concepts, methodology and current data.* Montreal, Canada: UNESCO Institute of Statistics. Accessed at http://unesdoc.unesco.org/images/0016/001628/162808e.pdf on 21/6/2015

Worthington, E. (2008). Effective learning environments in preschools. *A published Masters' of Science Dissertation,* Iowa State University. Accessed at http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1567&context=etd on 27/6/2015.