

The Role of Childhood Education Teachers in Developing Positive Attitudes towards Science Learning among Young Children

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Abstract: Despite the existence of considerable description of the importance of attitudes in the learning and teaching process, this study, as far as the authors know, is the first study in the Emirate of Sharjah which has tried to identify teachers' roles in developing positive attitudes among young children. Therefore, this study was designed to determine the role of childhood education teachers in developing positive attitudes towards science learning among young children. Following the aim of the study, sixty-two young children at Sharjah educational directorates in the United Arab Emirates (UAE) were interviewed. For collecting data, a semi-structured interview was employed. Overall, the findings from these interviews revealed that the prominent role of childhood education teachers in developing positive attitudes toward learning science was as follows: helping young children acquire scientific knowledge; developing young children's skills to use science applications in life; using in-class and out of class hand-on activities; and focusing on children-centered learning. In the light of these findings, a set of conclusions and recommendations were included.

Keywords: attitudes, science learning, childhood education teachers.

幼儿教育教师在培养幼儿科学学习积极态度中的作用

摘要: 尽管存在大量关于态度在学习和教学过程中的重要性的描述, 但据作者所知, 这项研究是沙迦酋长国的第一项研究, 它试图确定教师在培养积极态度中的作用小孩子。因此, 本研究旨在确定儿童教育教师在培养幼儿对科学学习的积极态度方面的作用。根据研究的目的, 对阿拉伯联合酋长国沙迦教育局的62名幼儿进行了采访。为了收集数据, 采用了半结构化访谈。总体而言, 这些访谈的结果表明, 儿童教育教师在培养对学习科学的积极态度方面的突出作用如下: 帮助幼儿获得科学知识; 培养幼儿在生活中使用科学应用的技能; 使用课堂内和课堂外的动手活动; 并注重以儿童为中心的学习。根据这些调查结果, 包括了一系列结论和建议。

关键词: 态度, 科学学习, 儿童教育教师。

1. Introduction

Most educational research studies have recognized the significance of attitude toward science learning, which confirmed the positive relationship between attitude towards science and pupils' learning performance [1-3]. That implies that young children

with more positive attitudes toward science learning are more likely to show a sustainable learning attitude that encourages them to continue with those subjects they enjoy [4, 5].

Science learning should not merely be limited to the acquisition of scientific knowledge; it is also important that the transmission of this knowledge influences the

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behaviors of young children [1, 6, 5]. Affirming this fact, Darling-Hammond [7] points out that young children's attitude toward what they study at school may be more crucial to their future than the exact knowledge they accumulate during school days. Therefore, attitudes toward science teaching and learning can be considered a substantial factor that can stimulate and direct children's behavior in certain ways [7, 8].

From a social psychologists' point of view, attitudes are important because of their potential to explain behavior [7, 8]. As such, attitudes are the motivation that converts knowledge and skills into action. They also refer to the willingness to employ scientific methods [4, 5, 8]. Oppenheim [9] indicates that most researchers agree that attitudes are a state of readiness, a tendency to respond in a certain manner when confronted with certain stimuli. More clearly, Oppenheim [9] states that attitudes are: "a single sentence that expresses a point of view, a belief, a preference, a judgment, an emotional feeling, a position for or against something".

At the international level, the development of positive attitudes in learners is regarded as one of the most important goals of science education. For instance, when teachers in the UK were asked to rank twenty aims of practical work, they placed the development of critical attitudes in students as one of the four aims at the top of the list [8, 10]. In this context, educators stress that one of the most important roles of childhood education teachers is to develop scientific attitudes in young children [2-4, 11, 12]. More specifically, most science curriculum reforms worldwide acknowledge that the major statements on the aims of science education include the development of attitudes, knowledge, and skills as they are an integral part of the child's integrated personality [3, 10, 12].

More specifically, the current UAE educational reform movement emphasizes that the development of positive attitudes in children towards science is one of the most crucial objectives identified by UAE educators regarding science education [13].

More importantly, in the teaching and learning process, developing young children's attitudes towards school subjects is critical and would lead to desirable educational outcomes [5-7]. In addition, the development of positive attitudes in learners towards school subjects is fundamental for three reasons: firstly, attitudes seem to be related to achievement and may actually enhance cognitive development; secondly, students with a positive attitude towards a subject are more likely to extend their learning in that subject; lastly, attitudes are often communicated to peers in a variety of ways throughout life [5-7].

Despite the importance of developing positive attitudes towards science, previous literature addressing

the development of these attitudes is sporadic and limited by factors that significantly affect the development of students' attitudes.

Many studies [3, 4] concluded that young children's attitudes towards science depended on their sense of the importance of science in daily life. Thus, it was found that children like science because they believe that it is important in life. Some studies [6, 8, 14, 15] found a significant correlation between developing positive attitudes in students and the teaching methods used in the classroom setting. They found that students taught by the laboratory approach had more desirable attitudes than their peers taught by the lecture-demonstration method. In addition, it was found that the science classroom environment and teaching approaches were the two most significant factors influencing students' attitudes [6, 12].

In addition, the family background is considered a crucial factor that may affect the children's attitudes to develop positive attitudes toward learning science. It has a considerable role in children's academic performance at all grade levels. A variety of studies showed a significant effect of the family background on the children's teaching and learning in school. It is largely recognized that the quality of family interactions is positively related to children's academic motivation and achievement. It has shown a strong relationship between the educational role of the family and the achievement of educational goals among children. It is due to family support to assist their children to attain educational targets [3, 5, 8, 13].

More obviously, various studies [13-15] revealed that students' family environment contributes effectively to developing children's attitudes toward science teaching. That underlines that a family's cultural and scientific level is a major factor in developing positive attitudes in young children.

Moreover, children's interest is considered a critical and prominent factor in developing children's attitudes [4, 6, 14]. Therefore, some studies have emphasized the role of teachers in learning environments; they must give a high level of consideration to the science teaching approaches catering to children's interests [9, 11, 14].

In this context, educational studies [3, 4] revealed that the absence of children's enjoyment of learning science is one factor that negatively affects the growth of positive attitudes towards science learning. Potvin & Hasni [3] contend that the role of teachers in addressing children's interest to learn scientific and technological subjects is one of the main significant issues. It is associated with young children's achievement and willingness to pursue their studies and careers in scientific and technological areas.

Furthermore, children's interest in learning science was regarded as a center of science curriculum reform in the UAE since it affects a student's focus on learning

[13]. Some research [3, 15] investigated students' attitudes toward science and indicated a continuous decline in school students' interest in science. These studies showed that students reported a decline in their attitudes towards science; they feel more detached from science and find it more challenging to relate to practical life [2, 5]. The declining attitude has been found at the starting of the elementary level of schooling or secondary schools [5, 6, 15].

1.1. Research Problem

Various researchers have done a large body of work worldwide regarding students' attitudes towards science. However, in UAE, despite a few studies investigating students' attitudes in the high grades, the authors of this research did not find any study investigating the role of teachers in developing young children (aged 5-8 years) attitudes toward science learning in Emirati schools. Therefore, this study has emerged to investigate the role of childhood education teachers in helping young children develop positive attitudes towards science teaching and learning, especially in the early education grades, which is considered a crucial stage for developing attitudes. In this respect, Thomson et al [16] mentioned that the most positive attitudes toward science exist at the third-grade level. Moreover, from the researchers' point of view, this investigation is unique because it will shed light on young children's attitudes in the early grades, particularly as these attitudes have a considerable role in affecting children's future development of attitudes towards science teaching.

1.2. Research Aim and Question

Based on the previous discussion, the outcome of this study will indicate the achieving of the general goals of the Emirati educational reform movement, especially as this movement has asserted that children should develop positive attitudes towards science teaching [13]. Consequently, the study's primary purpose was to investigate the role of childhood education teachers in enabling young children to develop positive attitudes to science learning. More specifically, the study attempts to answer the following question: What are the roles of childhood education teachers in enabling young children to develop positive attitudes toward learning science?

2. Research Methodology

2.1. Participants

The study sample consisted of children in the childhood education grades (aged 4-6 years) in Sharjah educational directorates in UAE. The researchers selected this age group because it is a transitional grade to the primary stage. A specialized teacher should teach each subject rather than a childhood education teacher.

Consequently, sixty-two young children from the childhood education classes were randomly chosen for in-depth interviews. Thirty of these children were females, and the rest were males. Each child had an interview of approximately thirty minutes.

2.2. Instrument and Procedures

Research regarding attitudes related to science education roughly focuses on quantitative approaches. The researchers used an interview as part of the qualitative approach in this study. Urquhart [17] mentions that qualitative research can go deep into the individual's feelings. Therefore, an interview is an appropriate method of measuring children's attitudes toward science, especially as some of them cannot express their feelings using a questionnaire because some children in this age group are unable to read or write [17-19].

The interview questions were designed to provide information regarding the role of the teacher in developing children's attitudes towards science. A list of twenty-five positive and negative questions was prepared and listed randomly in the interview. The questions were developed to ask children different perceptions of the importance of science in daily life, the extent to which they enjoyed their science lessons, attitudes towards practical activities conducted in the science laboratory, and views on how hard it is to learn science.

For establishing content validity and clarity of the instrument, the interview questions were checked by a panel of five experts. Eight questions were omitted at the end of this stage, and the rest were revised. Thus, the final format of the interview consisted of seventeen questions. These questions were pilot tested with thirteen children so that the researcher could guarantee that the questions were clear for children. Moreover, young children's responses were consistent by including repeated questions in different forms.

2.3. Data Analysis

The interviews were tape-recorded and fully transcribed for data analysis. The data were analyzed using the grounded theory approach, which was used to identify the teacher's role in developing children's attitudes regarding the question of the study. Also, some extracts were recorded verbatim from transcriptions during the analysis to be quoted during the presentation of the findings.

The preliminary analysis found that the respondents perceived a set of roles of childhood education teachers that positively influenced developing positive attitudes towards science learning. These roles have been divided into four categories. These categories were labeled as follows: helping young children acquire scientific knowledge, developing young children's skills to use science applications in life, using in-class

and out-of-class hand-on activities, and focusing on the approach of children-centered learning.

3. Research Results and Discussion

The study results are presented and discussed based on the roles of childhood education teachers. Each of these roles is presented and discussed below.

3.1. Helping Young Children to Acquire Scientific Knowledge

In the early stages of the interview, young children were asked various questions concerning their interest in learning science. All of them expressed the importance of learning science in life. It is worth noting that most children (100%) in this study replied positively to most interview questions related to this theme, as young children considered science teaching as the best source to learn about objects related to their lives. In addition, children provided various responses underlining the importance of science teaching. Some of these were:

"Of course, I am interested in science classes; we cannot learn anything about our environment".

"...Science classes helped me know much information related to plants".

"I have learned from science lessons various information about my health".

"Yes, science teaching is very important because my teacher provides us with different information regarding year seasons".

Reviewing the above quotations shows that children have positive perceptions regarding the importance of science teaching because they consider science as the only subject which can provide them with scientific literacy related to daily life issues. This result supports Harlen & Qualter's [12] view, stressing that science teaching in the primary stage is a scientific, cultural source for children. Furthermore, according to Harlen & Qualter [12], this literacy is essential for children since young children's early experience will assist them to make sense of science and the work of scientists and understand the world around them [16].

3.2. Developing Young Children's Skills to Use Science Applications in Life

Over 90 % of the participants' responses reveal that young children like science classes because they provide them with the applications of scientific knowledge and how this knowledge can be applied and employed in their daily lives. Some of the children's quotations can be mentioned as follows:

"Yes, we have to learn science... it helps us know and deal with everything science subjects assist me in how my mum can look after plants in our home garden".

"Through science classes, we suggested a plan concerning the effective way to use water in daily life".

"We use scientific thoughts in my daily activities... these uses make me a good person... I knew the hygienic habits... I knew how I can maintain my body hygiene and protect it from diseases and pollutants."

More optimistically, the data analysis revealed that the study participants expressed that they like science lessons because their teachers make science a part of their lives. That has effectively contributed to creating positive attitudes towards early science experiences. This result can be attributed to the outstanding teaching performance of childhood education teachers in the early childhood education grades because they help children apply scientific knowledge in their lives. That, in turn, provides clear and logical evidence that how young children perceive science and the work of scientists is partially influenced by how scientific knowledge is taught to them in and outside science learning environments [16, 20-22].

More clearly, this finding was confirmed by all the study participants. As they all said, we know how we can employ or apply scientific knowledge, whether in our daily routines or when we face any problem where we need to apply scientific knowledge. That may be ascribed to the teachers' classroom performance, who say that children in the early stages of education should be able to apply knowledge, and life skills related to science. This finding is consistent with the constructivist learning view, which stresses that children must be allowed to apply and employ their ideas in a variety of social contexts [12, 22-24]. In addition, this result is in line with Bloom's Classification of Learning Outcomes [25, 26], as the teachers focus on learning outcomes based on understanding and applying knowledge and developing thinking skills.

3.3. Using Hand-On Activities Inside and Outside the Classroom

Concerning young children's attitudes towards hands-on activities, the data analysis showed that 87% of the responses reported that using hands-on activities can develop positive attitudes towards science classes. In addition, this study found that childhood education teachers give children the opportunity to carry out science lessons using hands-on activities in the science laboratory or classroom. Some of the following quotes indicate this feeling:

"Yes, I like to go to the science laboratory... yes, my teacher allows us to learn science through hands-on activities... Also, I like practical activities, but we always do them in the science activities room".

"We carry out practical activities in science laboratory and classroom because they train us to be scientists".

"I like to carry out practical activities at home because my parents motivate me to do as many practical, scientific activities as possible".

“When I go to the ground floor, I am happy because I see the science activities room, and I hope to spend most of my time in it”.

The preceding excerpts reveal that hands-on activities play a crucial role in influencing the development of positive attitudes towards science teaching. This result can be justified by the role of hands-on activities in enabling young children to learn through process skills. In this context, some educationalists [6, 17, 27] underline that learning through hands-on activities is a method of education in which children are forming their ideas through action. Instead of simply listening to a teacher about a given subject, children can engage with the content knowledge to solve a problem or create something.

However, the children's responses indicate that childhood education teachers prioritize science laboratory classes to learn science through practical activities. In addition, parents' positive attitudes affect children's performance in practical activities at home. That confirms that parents understand that their children should learn a language alongside science and mathematics. That, in turn, fostered positive attitudes towards science learning from the early grades.

More clearly, this finding is consistent with earlier literature stating that young children's learning should be built upon hands-on activities [17, 19, 23]. The substantial value of hands-on activities may be seen in their ability to connect previous knowledge with what is now learned. Moreover, the hands-on activities database provides hands-on and ready-to-do activities in various early childhood settings.

This finding generally conforms with the constructivist learning perspective, which states that children can construct scientific knowledge by carrying out practical activities because they enjoy constructing their knowledge [20, 22, 26]. More importantly, Harlen and Qualter [12] stress that practical activities are at the core of primary science teaching because they provide first-hand experience in an environment where a great deal of learning occurs in the early learning grades. More specifically, children are more likely to improve skills when they are having fun and when the skills have meaning for them; hands-on learning provides both characteristics of learning.

3.4. Focusing on a Children-Centered Learning Approach

The data analysis revealed that 80% of children's responses clarify that children enjoy science classes because teachers provide a supportive learning environment focusing on learners themselves. Some expressed their views as follows:

“I enjoy science classes because the teacher asks the questions, then she allows me to think and give her answers”.

“I love science lessons because my teacher gives me

feedback in each science lesson”.

“I like science classes because my teacher provides me with an opportunity to do hands-on activities. She spends all the time training me to explain and describe my thinking”.

“I like to be in a science lesson because my teacher allows me to participate in classroom activities”.

“I like science classes compared to other classes because the science classes' questions urge me to think meaningfully”.

“I would like science lessons to last longer because what we say in the lesson can help us become scientists... So, I like science learning because it helps me criticize and give judgments about various issues”.

The above quotations demonstrate that children's positive attitudes towards science classes lead them to like science teaching and learning. On this basis, it appears that the reasons for the creation of positive attitudes towards science teaching can be explained from young children's views as follows: the teacher provides children with an opportunity to take part in the lesson about answering the questions raised in the classroom interaction; he or she provides children with feedback concerning their learning; he or she focuses on child-centered learning in acquiring knowledge through developing process skills in the children; the questions included in science textbooks do not take into consideration the individual differences amongst children; the teacher creates an opportunity to produce knowledge through practicing critical and creative thinking processes. This result indicates that the child is a source of knowledge rather than a recipient of knowledge, which helps develop positive attitudes towards learning science.

Consequently, this aspect of the study, related to how young children enjoy their science classes, states that good classroom behaviors from primary education teachers were one of the major reasons leading to children's enjoyment of their science lessons. Such behaviors indicate that primary teachers are well-qualified and confident to teach young children. This result supports the view that what the teacher does in the classroom does make a difference in students' attitudes [3, 4].

In addition to the previously discussed, it is clear that interest in science classes may be ascribed to teachers' role in encouraging children to use hands-on activities and focus on child-centered learning. Ormrod and Motta [24, 28] emphasize that learners' interest in science classes can be achieved using laboratory work.

Based on the findings presented above, the most important factor affecting children's positive attitudes was the good learning practices by childhood education teachers. All children expressed the same feeling: science is a very interesting subject. The researchers believe that this feeling, which affects children's attitudes, can be attributed to how children are taught

science, focusing on practical (concrete) knowledge rather than theoretical (abstract) knowledge. This finding is in line with the previous studies [26, 29, 30], pointing out that the development of positive children's attitudes towards science relies on the way science is learned rather than the nature of the subject itself.

4. Conclusions and Implications

Great emphasis is placed on the role of science in young children's learning to become scientists. However, the effective role of developing positive attitudes toward science learning is dependent on the teacher's understanding of this role. Unfortunately, the current perspectives related to the development of attitudes in the instructional process tend to concentrate on the child's role as a learning center rather than the teacher. That means that young children must be given as many opportunities as possible to explore and respond to various science learning opportunities. Despite the existence of considerable description of the importance of attitudes in the learning and teaching process, this study, as far as the authors know, is the first study in the Emirate of Sharjah which has tried to identify teachers' roles in developing positive attitudes among young children. This study was designed to determine the role of childhood education teachers in developing positive attitudes towards science learning among young children. Following the aim of the study, sixty-two young children were interviewed.

Based on the findings of this study, it can be concluded that, generally, children's attitudes towards science teaching and learning are positive. That is in line with the current perspectives underlining that the development of positive attitudes towards science teaching should occupy a high priority for science educators and decision-makers [7, 29]. That can be attributed to the fact that children in public schools are indoctrinated with science by spoon-feeding teaching methods (mainly lecturing). Therefore, it was found that although young children appreciate the importance of science teaching concerning daily life, they do not like science classes because they do not enjoy them. In addition, children prefer to learn from science textbooks, using learning by rote and memorizing.

However, this study concluded that the roles influencing the development of positive attitudes in young children are as follows:

1. How science is taught greatly impacts children's attitudes. That is consistent with the view expressed by Smith and Spielman [26, 31] that the way by which the subject of science is taught has a significant role in affecting children's attitudes. Several studies [13, 18, 20, 30] found that learners taught by small group laboratory approaches report more positive attitudes towards science compared to their peers taught by large lecture-demonstration. Therefore, this study stresses that primary childhood education teachers must employ

hands-on activities in the classroom and must avoid focusing on lecturing. In addition, they must pay great attention to applying this knowledge acquired in science classes in daily life activities. In general, much attention should be given to the classroom environment. Many educationalists [7, 25, 26, 29, 30] mentioned that the classroom environment should capitalize on student interests, curiosity, and confidence in their aptitude, which appear to be central associates of student motivation".

According to the above, more emphasis should be placed on developing children's information processing skills by providing them with the opportunity for such development in the science classroom.

2. A teacher's classroom performance has an influential impact on developing positive attitudes toward science. It was found that the teacher's practices in science teaching can be regarded as the most important variable in the development of children's attitudes. The researchers' experience points out that teachers are qualified to teach young children because they are specialized in childhood education. Thus, this may result in creating positive attitudes towards science learning. Based on this, the teachers and parents who are confident or have positive attitudes towards science learning can positively affect children's attitudes because children imitate their teachers. In this context, various studies [14, 22, 30, 32] state that young children tend to imitate the attitudes of significant adults when expressing their attitudes. Therefore, teachers who have negative attitudes towards science can pass these attitudes on to children.

In the same line, Ualesi & Ward [25] recommend that teachers' attitudes toward science teaching be highly positive with a major goal of assisting students to learn as much as possible in ongoing lessons. Consequently, it appears that childhood teachers must be well equipped and adopt positive attitudes towards teaching to behave in a way that can help children develop positive attitudes. Educational literature [24, 27, Centre on the Developing Child] underlines that the changes in students' opinions of science rely on a teacher's classroom behavior and the classroom environment he/she establishes. This discussion suggests that classroom activities should focus on cooperative learning activities that promote child-to-child interaction.

3. There is a significant relationship between the development of children's attitudes towards science and parents' views of science teaching in the early grades. Parents' positive attitudes towards science will be transmitted to their children. To consolidate this factor, the teacher should send journals to children's parents to communicate the importance of science teaching and to learn in the early educational grades.

As a result of this study, it is worth recommending that there is an urgent need for further research

regarding science teaching and learning in the early educational grades (aged between 4-6 years), especially as this field of research is still neglected in UAE schools. Additionally, future research should investigate young children's parents' perspectives of primary science teaching and learning and teachers' practices in primary science classes.

This study was limited by the number of young children in the Emirate of Sharjah who volunteered to participate in the semi-structured interviews. Therefore, the generalizability of the study results may be limited to young children in the Emirate of Sharjah in the United Arab Emirates. For generalizability, similar Studies may be conducted in other states, such as Dubai and Abu-Dhabi, with a large population of young children.

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