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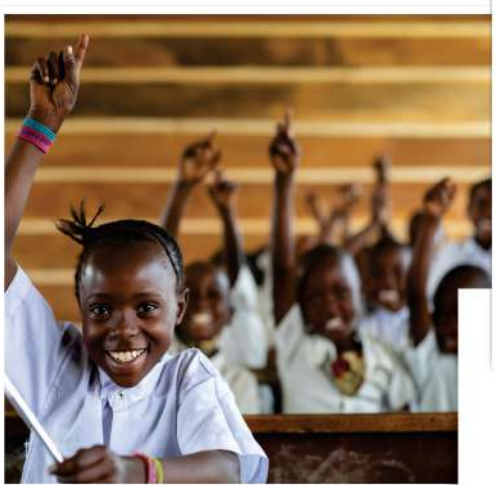
INNOVATIVE STRATEGIES FOR TEACHING VOCATIONAL, SCIENCE, TECHNOLOGY AND MATHEMATICS EDUCATION: CLASSROOM PRACTICES



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PREFACE

The electronic book (e-book) acknowledges that traditional methods in Vocational, Science, Technology and Mathematics Education: Classroom Practices may not be sufficient to equip students with the necessary skills for a rapidly evolving technological landscape.

Therefore, it advocates for the adoption of Innovative teaching approaches that promote a more dynamic and effective learning experience.

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TABLE OF CONTENT

FOREWORD

This book entitled "**Innovative Strategies for Teaching Vocational, Science, Technology and Mathematics Education: Classroom Practices",** is a book of readings on various innovative classroom pedagogies. It is a welcome literature for Education System and a very important resource book for teachers who are functioning in the disciplines of Vocational Education, Science, Mathematics and Technology education and training. It is a compendium of most of the **active learning strategies** aimed at producing graduates who have been prepared for adaptation to the conditions of the 21st century world of fluidity. The 21st century world accommodates soft skills which the individual can edit from time to time as the conditions of socio-cultural, economic and technological environments change constantly and uncontrollably. A century in which cross-border job openings are important means of employment, a century where attitude is more important than subject-based excellence, a century where collaboration, innovation and creativity are irreducible demands by employers of labour, a century where adaptive skills are critical for entrepreneurship, creation of jobs and wealth.

All categories of teachers at all levels of education would find this resource book interesting and professionally helpful for their teaching practice. Because conditions of the modern world are in perpetual flux, teachers have to re-skill in order to produce adaptive graduates and the era of lecture method is literally over. It is these modern innovative instructional strategies that would enable teachers to produce such graduates who would survive and then succeed in the 21st century global economy.

This book would also be very useful to researchers and innovators in the envisioned pedagogic paradigm shift of this era. I therefore, proudly recommend this book, a compendium on innovative pedagogies to all classes of teachers and researchers on pedagogies and curriculum reforms in the modern era.

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DEDICATION

This book is dedicated to educators in the world

CHAPTER 8

ENHANCING ACQUISITION OF SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) SKILLS IN EARLY CHILDHOOD EDUCATION

Obiefuna Grace C
Nwankwo Glory U.

Abstract
This work delves to expose the effective approaches in enhancing science, technology, engineering, and mathematics (STEM) skills learning in young children. It values the impact of play-based learning approaches such as block building activities, puzzles and interactive games on STEM skills; and considers the strategies to promote STEM learning at early childhood education (ECE). Early childhood educators can effectively cultivate STEM literacy and skills through play-based, inquiry-driven approaches, laying a strong foundation for future academic success and life-long learning. Children exposed to STEM activities earlier are known to demonstrate significant improvements in problem-solving, critical thinking, and creativity. Preparing children for a STEM-focused future helps them understand their interests and place in the world. It can boost their confidence, self-esteem and also break gender stereotypes so they can be who they want to be and achieve their goals. All these have implications for STEM education policy, curriculum development, and teacher training in early childhood education.
Keywords: STEM Education, skills, Numeracy, Environment

Introduction

STEM is an acronym for Science, Technology, Engineering and Mathematics.
Science – This involves observing, making connections, coming to conclusions, and asking questions about how things work. For preschool-age children, science-related learning activities might include exploring water and sand, comparing natural materials like rocks and soil, rolling balls across the room, and looking through a magnifying glass to count how many legs are on the ant that was caught during outdoor play.
Technology – This involves using tools, identifying problems, and trying different solutions to make things work (Sally, 2023). Technology-related learning activities for preschool-age children might include identifying simple machines like gears, wheels, and pulleys.
Engineering – This includes using tools, identifying problems, designing, creating solutions, and building and inventing things. Engineering activities can happen in the building blocks play area, where preschool-age children plan and design structures every day with little teacher direction.
Mathematics – This usually involves, measuring, counting, patterning, exploring shapes, comparing size/weight/volume/height/distance. Math-based learning activities in the preschool classroom include counting, matching shapes, and making patterns.
STEM (Science, Technology, Engineering and Mathematics) education is important in an ever-evolving world. It provides children and young people with essential lifelong skills (Ali, 2022). It empowers them to be thinkers, ask vital questions, and encourage discussions. The subjects in STEM are also a part of our everyday lives and can positively impact our economy and benefit our society. Therefore, STEM education is more important and relevant than ever. While STEM is traditionally for students in secondary schools and above, it is becoming more widely recognised as essential in early years learning. Children today are growing up in a world that is rapidly changing economically, socially, environmentally, technologically and politically.

Learning STEM subjects can help them succeed in their future endeavours and positively contribute to modern society. Thus, Ali (2022) said that STEM education has targeted secondary school-age children and beyond. Its role in early childhood is becoming increasingly apparent due to the numerous associated benefits. Not only does it help young children to develop essential

lifelong skills, but it also increases their chances of a successful education and career later on in life.

In a rapidly changing world, science, technology, engineering and maths are highly sought-after subject areas, which are likely to increase in the future. As technology develops and challenges, such as climate change, overpopulation, disease and famine, increase, we need more people entering STEM roles to think outside the box, innovate and develop new ideas.

However, the efforts of parents, caregivers and educators stimulating interest in these subjects in early childhood may encourage young people to study them at an advanced level and choose jobs within STEM-related fields. It does not take much to start and incorporate the subjects into everyday activities and life. Hopefully, the strategies and tips in this chapter can be used as a starting point.

Statement of the Problem

The acquisition of Science, Technology, Engineering and Mathematics (STEM) skills in early childhood education is essential for fostering critical thinking, problem-solving, and creativity. However, many early childhood education settings struggle to effectively integrate STEM concepts, resulting in a lack of foundational knowledge and skills in these areas. This inadequacy can lead to decreased interest and performance in STEM subjects as children progress to higher levels of education. Also, traditional teaching methods often fail to engage young learners, hindering their ability to develop essential STEM skills. Therefore, to ensure a strong foundation for future academic success and build a lifelong interest for learning, there is a need to explore innovative approaches to enhance the acquisition of STEM skills in early childhood education.

Purpose of the Study

The main purpose of this study is to examine effective strategies for introducing STEM concepts in early childhood education for STEM skills acquisition. Specifically, it seeks to;

i. To develop innovative approaches in other to enhance STEM skills acquisition.
ii. To foster curiosity, creativity and problem solving abilities from an early age.
iii. To prepare young children for future academic success and career in STEM fields.
iv. To enhance effective techniques for teaching and curriculum development for early childhood STEM education.

Importance of STEM Education at Early Childhood Education (ECE)

From birth to eight years old is the most crucial period of human development; period at which the child quickly grow physically, emotionally, socially and will develop essential knowledge and skills. During this period, what children learn will significantly influence their development and set the foundation for their success in education and life generally.

Young children naturally explore the world around them, interact with their environment and are interested in many things such as picking up worms, creating mud pies, building structures or playing with toys. They will ask questions, figure out how things function and have a natural curiosity. Nurturing their real-world experiences and play can form part of their STEM education (Kleopatra and Ioannis, 2023). Introducing STEM concepts in early childhood is crucial for a child's development for the following reasons:

a. It helps children to better understand the modern world around them, which can help build confidence and self-esteem and enable them to thrive (Ali, 2022)
b. It establishes vital lifelong skills, such as critical thinking, language, communication, and problem-solving (Ali, 2022).
c. It provides children with a great foundation to help them prepare for learning these subjects in higher education.
d. It may help increase children chances of ongoing academic success if they have knowledge of these subjects from early years (OL-College, 2024).
e. STEM education aids children to develop new ways of learning, enhances literacy and numeracy, and promotes creativity and curiosity.

f. It provides a fun and engaging way for early years children to learn these subjects so they develop an interest in them later on.
g. Early childhood experience with STEM is an emerging field of research; and has been discovered that children's self-belief enhanced their ability to learn STEM and triggered an appreciation for it and its value in everyday life.

STEM Concepts for Early Learners

In STEM education, the four subject areas are already incorporated in some way in the learning and development requirements, e.g. understanding the world and mathematics. It is just knowing how to incorporate STEM concepts into the curriculum and child-centred play-based education.

STEM education can start at any age and it is never too early for children to learn these vital concepts. However, they must be age-appropriate and meet children's needs. For example, for children aged 3-8, STEM should be incorporated into play to make it engaging and fun. Adults should provide different types of activities, resources and toys to encourage participation (OL-College, 2024). Young children should be able to use their imaginations, be creative and work together while learning.

STEM does not require expensive resources or specific training. Nor does it need to occur at a particular time, day or setting. In fact, STEM concepts can be integrated into everyday experiences, as these subject areas form a part of our daily lives. Whether it is adding up the cost of items when shopping, comparing foods when choosing groceries, measuring ingredients when cooking, discovering nature on a walk, using technology or growing plants from seeds, it all counts.

Parents, caregivers and teachers should understand the philosophy behind STEM approach and know how to nurture creativity and exploration in the children they are responsible for, so as to introduce STEM successfully (Kleopatra and Ioannis, 2023).

Strategies to Promote STEM Learning at ECE

Caregivers and educators should promote STEM learning as early as possible, as it is essential for young children's development. STEM activities can consist of planned, unplanned activities, a mixture of free and adult-led play. Some practical tips and techniques caregivers and educators can adopt to promote STEM learning are as follows as highlighted by Webfx (2020), Ali (2022), OL-College (2024) and Lena (2025);

i. Provide young children with STEM toys to combine fun with learning. Toys may include science kits, building sets, magnetic tiles, number sets, etc.
ii. Incorporate STEM learning into everyday activities. E.g. teaching young children about maths when measuring ingredients for baking or cooking, or spotting the difference, identifying and counting trees on a walk, etc.
iii. Ask young children open-ended questions to get them to observe, think and reflect on what is going on. For example, if a child is building a tower with building blocks, a good question may be, "What do you think you will need to keep it from falling over?".
iv. Use free resources and materials, e.g. toilet roll tubes, cardboard boxes, lollipop sticks and plastic bottles, to build structures and teach young children about engineering and how things work.
v. Run safe experiments to teach young children about science. use simple kits or ingredients and items for demonstration, such as coins, papers, stones etc.
vi. Use printable resources and worksheets with various activities to teach young children about STEM. Learning resources, including puzzles can be used.
vii. Use online interactive games and quiz to teach young children about science, technology, engineering and maths theory, e.g. Time tables 1-12 songs, maths game: Defenders of Mathematica (here, you need to add, subtract, divide and multiply your way to victory), Karate cats game – loaded with maths challenges, Crystal explorers – here, you solve puzzles and collect crystals!
viii. Use STEM storybooks, videos and activity books to support learning. E.g. Little red riding hood to teach about habitats, Jack and the beanstalk – to teach about plants, Three little pigs – help children to think of different materials used for construction.

ix. Children should have time to engage in their own play with minimal adult interference. They will still be learning while playing.
x. Provide a STEM-friendly environment to foster investigation, curiosity and creativity. It should allow for STEM learning to happen anywhere and at any time.

Overcoming Gender Stereotypes in STEM at ECE

Gender bias can lead to gender stereotypes, "a generalised view or preconception about attributes or characteristics, or the roles that are or ought to be possessed by, or performed by, women and men". These stereotypes can be harmful, as they limit children's potential, which can be damaging later in life.

As children grow, gender biases and stereotypes can influence the opportunities and activities they have access to, what they learn and how they develop (OL-College, 2024). Parents, caregivers and educators can inadvertently reinforce these stereotypes by speaking differently to boys and girls, having different expectations of them and assuming they want to do certain activities, e.g. boys want to play with trucks and climb trees, but girls want to play with dolls inside.

Gender stereotypes in STEM education can mean girls missing out on opportunities later on in life and boys steered in a direction that is not right for them as individuals. It is essential to tackle gender bias and stereotypes in early childhood and early years learning by encouraging girls and boys equally in STEM activities, for example:

a. Teach all young children about STEM, why it is important, and the careers available regardless of gender.
b. Share stories about men and women in STEM so they can potentially see themselves in these roles. Get those in STEM careers to visit the setting or take children on outings to meet male and female role models in STEM.
c. Create a gender-neutral learning environment, i.e. providing a mix of various toys, games and activities and guiding their learning. It may also be advisable to have materials, resources and books that describe males and females in STEM fields rather than outdated ones that reinforce gender stereotypes.
d. Allow children the freedom to choose their own interests and activities and the things they want to play with, regardless of whether girls choose construction toys or if boys choose dolls. It should be their choice, and adults must not force them to play with something because of their gender (OL-College, 2024).
e. Be mindful of not inadvertently reinforcing gender stereotypes, i.e. "Are you sure you want to choose that toy as science is not really for girls".
f. Try to include STEM in activities where boys and girls choose 'stereotypical' toys or games. For example, if girls want to play with dolls, it may be an idea to suggest they build a pram from materials and tools.
g. Choose toys, games and activities to encourage boys and girls to play together where they can learn collaboratively.

Rationale and Objectives for Promoting Mathematical Skills in the Early Years

It is necessary to start building the love for maths and science early in life. Introducing maths and science to young children doesn't have to be complicated. Parents and caregivers don't have to wait until a child can solve written math problems or conduct complex science experiments. Activities such as finger painting, building blocks and baking are fun and interactive ways to build science and math skills in children (Webfx, 2020).

Simple childhood games can promote significant STEM skills at a much earlier age. The years before kindergarten, are a critical period to help develop these skills through fun activities that get their hands and minds working.

Teaching mathematical skills in the early years is crucial for several reasons. Below are some of the key rationales /objectives for why it is important to introduce math education at a young age:

1. **Cognitive Development**: Mathematics helps in developing critical thinking and problem-solving skills. By engaging with mathematical concepts early on, children learn to analyze and solve problems, which can enhance their cognitive abilities.

2. **Foundation for Future Learning**: A strong foundation in mathematics in the early years sets the stage for success in more advanced mathematical concepts in later years. It helps children build a solid understanding of numbers, patterns, shapes, and spatial relationships that are fundamental to higher-level mathematics.
3. **Life Skills**: Mathematical skills are essential in everyday life. From counting money to measuring ingredients for a recipe, basic math skills are used in various real-life situations.
4. **Promoting Logical Thinking**: Mathematics is a subject that requires logical thinking and reasoning. According to OL-College (2024), teaching math at an early age helps children develop logical thinking skills, which can be applied not only in mathematics but also in other areas of learning and problem-solving.
5. **Building Confidence**: Success in mathematics can boost a child's confidence and self-esteem. By providing opportunities for children to explore and succeed in math from an early age, educators can help build their confidence in their mathematical abilities.
6. **Preparation for Future Careers**: In today's increasingly technology-driven world, mathematical skills are in high demand. Introducing math education in the early years can help prepare children for future careers that require strong quantitative and analytical skills.
7. **Enhancing Spatial Awareness**: Concepts such as shapes, sizes, and spatial relationships are fundamental to mathematics. By introducing these concepts early on, children can develop a better understanding of the physical world around them and improve their spatial awareness.

Role of Play in STEM Education

OL-College (2024) described play as **what children and young people do when they follow their own ideas in their own way, interests in what they do and for their own reasons.** It has been recognised as a right of every child. This is because children have an innate drive to play. Play has many advantages, as it stimulates brain development, fosters creativity, helps develop essential skills and allows children to make sense of the world around them (Ali, 2022; OL-College, 2024). It also builds a strong foundation for future learning.

Play-based learning (PBL) is where children learn while playing. It can be child-led, where children direct their own play while an adult observes but not intervenes, or adult-led, where adults, such as parents or teachers, guide the play; they select activities and materials to focus on specific areas and reinforce key concepts.

PBL combines free play with specific learning outcomes for early year's children. Therefore, it is important in STEM education, as it provides many learning opportunities for them to explore, create, discover, experiment and imagine in playful and fun ways (OL-College, 2024). Teaching STEM through PBL helps keep young children engaged and motivated to learn, enhancing their literacy, communication, numeracy, problem-solving, social and creativity skills.

*Some examples of STEM-related toys that encourage exploration and problem-solving includes:

a. Snap Circuits – teaches basic engineering, electronics and circuitry. The beginners set is for ages 5+ and the plus set, 8+.

b. Magnetic tiles – these enable children to learn to build stable structures using various coloured magnetic tiles in various shapes and sizes, e.g. Magna-Tiles, for children 3+.

c. Microscopes – can help children discover the world around them, e.g. My First Microscope, for ages 3+. They can explore natural materials, such as leaves, insects, etc. There are also bug viewers/magnifiers, which are cheaper.

d. Balancing toys – these are great for learning maths, especially counting. It requires children to balance numbers with toys on a scale, e.g. frog balance toy, for ages 3+.

e. Horrible science kits – have different experiments and games for children 6+ to explore scientific concepts.

Educational games: It is necessary to use numerous games for STEM learning, for example:

- Free online games from BBC Bitesize (maths games) and Wow Science (science games).
- Hunting for items indoors or outdoors, counting them, e.g. egg hunts, and seeing who has the most.
- Filling jugs with sand or water and putting them into buckets and tubs. Children could measure the right amounts to avoid overfilling.
- Making paper planes to teach children about engineering and science and see whose plane goes the farthest.
- Plant seeds to teach children about growing, i.e. grow beans and then measure them to see which has grown the tallest.
- Play traditional games, such as I Spy, which requires children to solve clues and guess objects.
- Drawing and painting specific objects and labelling parts to understand how things work.

Parents, caregivers and educators should choose STEM toys and games based on a child's interests and age and what they will find fun and captivating. They are unlikely to be motivated to learn if they find something boring. Observing and asking them questions is the best way to identify their interests. If possible, provide a selection of different toys and games to keep them engaged.
Activities: Parents, teachers and caregivers can offer these activities:

- Building structures / building blocks, knocking them down, testing them with weight, etc. engages kids in reasoning about physics.
- Cooking engages children in science and math through measuring ingredients and seeing how foods are prepared.
- Singing and dancing convey counting concepts.
- Through water activities, kids experiment. For instance, filling the cups or buckets, then watching how holes in objects affect water flow.
- In playing card and board games, puzzles, children use math; and reason about strategies.

Building on Children's Natural Inquiry, Investigation, Curiosity and Exploration.
The more curious a child is, the more he or she learns. Nurturing a child's curiosity is one of the most important ways that can help him or her become a lifelong learner (Sally, 2023). Babies are born learners, with a natural curiosity to figure out how the world works. For instance, a new-born follows sounds, faces and interesting objects with her eyes. Curiosity is the desire to learn. It is an eagerness to explore, discover and figure things out. This motivates the child to seek out new experiences and leads to greater success in school over the long term (Anne, 2018).

Tips for Nurturing Curiosity

1. **Model interest in the world around you:** Take a walk outside and wonder aloud about the trees, the sky, the stars. Also let the child see you pursuing interests of your own.
2. **Follow the child's lead:** Encourage natural interests. Children learn so much more through activities that capture their attention and imaginations (Lena, 2025). If he or she likes music, play it for him or her often, make and play instruments together, dance together. If bugs are the child's interest, give the child a shovel and a net. Find books on bugs and read to the child .
3. **Answer questions simply and clearly and according to the child's development:** You will answer a question about where babies come from much differently if your child is three or thirteen. And, no matter the child's age, it is important to ask them first what their thoughts are before answering. If you don't have the answer, say so. Let them know it's okay not to have all the answers. This also provides an opportunity to model how to find answers. Go with the child to the library or call someone else who might know.
4. **Use the library:** Take this field trip together often. Books are windows into all kinds of worlds to delight the curious mind. Young children who are exposed to books become better readers.
5. **Stimulate your child with open-ended questions:** These are questions that don't have a right or wrong response, and can't be answered with only one word like "yes" or "no". "How do you feel about…..", "What was (such and such experience) like for you….", "Tell me about what

happened in school today." These kinds of questions encourage children to develop his or her thoughts and ideas, shows love and their interest (Anne, 2018).

6. **Create an interesting environment:** Babies spend one-fifth of their waking hours in focused gazing. Their classrooms should be well decorated. They're curious about what's in their surroundings. Pictures on the wall and normal family activity are naturally fascinating. Give babies and young children safe toys and objects to explore.
7. **Redirect, don't discourage:** Try to figure out what is capturing the child's interest, or what skill he or she is trying to master and create a safe and acceptable way for the child to explore (Lena, 2025). For example, if your toddler is exploring the houseplants, put them out of reach but offer a close alternative.
8. **Allow time for open-ended activities:** Unlike some toys that are designed to be used a certain way, materials like boxes, blocks, water, sand, pots and pans, and any art material, can be used imaginatively (Anne, 2018). Do not tell your child what to do with the material, how to do it or what it should look like in the end. Let your child's curiosity be his or her guide.

Safe Tools in the Pre-Primary Environment

The physical environment, as well as all the materials and equipment are part of a child's learning experience. The schedule, space, interaction with others and daily routines all provide learning opportunities. The learning environment should provide a rich assortment of materials and equipment for children to develop socially, cognitively and physically.

The materials and equipment should:

- be available in a quantity and variety to occupy all children in attendance
- be consistent with the developmental capabilities of children in attendance.
- offer many types of play choices, to provide different opportunities for children to experiment, explore and learn
- be accessible to children where they can reach and use the materials by themselves to meet their needs
- be organized into particular interest centres, represent and encourage acceptance of diversity (race, culture, age, abilities, gender) in all activity areas
- be rotated and changed frequently based on the children's interests in other to broaden children's exploration and experiences

Safety is a priority in pre-primary environment. Unsafe toys and materials can put children at risk for injury or illness. According to Lauren (2016), A well-organized classroom that has safety procedures in place not only makes pupils/ students feel more secure, but it also shows parents their children are being well cared for.

How to ensure tools (toys/ materials/ equipment) safety

- Select toys and materials with safety in mind.
- Check the condition of toys and materials for safety.
- Perform a daily safety check of toys and materials.
- Teach children how to use materials and toys safely.
- Make sure all materials in the classroom, including plants, are nontoxic (Lauren, 2016).
- If any of the materials are damaged, they should be removed and replaced.

Different tools/ materials can be used to support play, both in the indoor area and the outdoor area, such as:

- soft flooring and cushions
- large soft toys
- mobiles and hanging items
- toys to push and pull, and ones that the children can climb into and out.
- Small tables and chairs
- a home corner or play house
- book corner
- messy play area (paint, glue, mud, leaves etc.)
- water and sand

- a drawing area including lined paper, and a variety of pens and pencils to encourage them to write
- table top toys and building toys, bricks, dolls to dress and undress, puzzles, floor toys - garages, train tracks, jigsaws, miniature cooking utensils.
- nature table or an area with plants, soil, insects etc.
- mathematical toys,
- balls
- fixed slides, climbing items for them to climb and jump on and over (suitable for their age)
- toys to push and pull
- bikes and tricycles.

Key Features of Enriching Indoor and Outdoor Learning Environments

Learning environments are a critical part of a child's development and have a direct impact on educational experiences. It is important that children have access to rich learning environments that are comfortable, interesting and aesthetically pleasing for learners.

Environments should also be made appropriate for the needs of children based on their age or stage of development; a one-year-old obviously wouldn't benefit from the same learning environment as a five-year-old!

Ultimately, the setting should be a place where children are able to discover, explore, play and learn while feeling safe and secure through having their needs met (Lauren, 2016)

Things to consider when setting up indoor learning environment

It's really important that indoor spaces are carefully designed in order to flexibly accommodate children's evolving needs and interests. When setting up the indoor learning environment the following things should be considered:

- **Is there space for physical activities that are developmentally appropriate?**
  E.g. area, that will allow children to learn in an independent way.
- **Is there an opportunity for variety and transition between activities? This** is to stimulate their senses. E.g. using textures, colours, sounds and smells, as well as changing social groups and activities.
- **Where decorations used appropriately?**

Decorations are also important to providing stimuli for children, through the use of colour, and when used effectively will develop different moods around the room. Ensure to switch up decorations often, in order to add some exciting new stimuli to the environment.

- **Are the resources accessible?**

The resources should have high-quality and developmentally appropriate, but they should also be easily accessible to children. This is key to supporting independent, child-led activities that will benefit them by allowing them to choose activities based on their fascinations and interests.

Things to consider when setting up outdoor learning environment

a. **Is the space easily accessible?**

In order to facilitate effective outdoor learning, children should have access to the outdoor learning environment on a regular basis. If possible, children should be able to move freely between the indoor and outdoor environment settings.

b. **Are there adequate spaces for different physical activities?**

Young children are physically active beings that benefit from activities that are appropriate to their physical development. E.g. water areas and mud kitchens, which will allow learners to explore different experiences with diverse stimuli.

c. **Are there opportunities to connect with nature?**

Being outdoors opens up plenty of opportunities for little ones to connect with nature. It is necessary to make the most of natural resources like leaves, bark and sticks to offer opportunities for learners to explore and examine items and use them to play or build.

Promoting Numeracy: Indicators for children at ECE

Shichida (2025) stipulated the following key points;

- Numeracy is the ability to see and use maths in all areas of life. It is all about understanding numbers and using them in our day-to-day life. For young children, it's not just counting 1, 2, 3; it may involve spotting patterns, figuring out how many apples you have, or sharing toys equally
- Children build maths and numeracy skills through play.
- Everyday activities like counting, looking at shapes, and talking about sizes also help children develop early numeracy and maths skills
- The child's everyday experiences are full of learning opportunities that lay the foundations for numeracy.
- Numeracy skills involve understanding numbers, counting, solving number problems, measuring, estimating, sorting, noticing patterns, adding and subtracting numbers, and so on.

Children need numeracy and maths skills to do everyday activities like:

- solving problems – for example, how long will it take to walk to school?
- understanding patterns – for example, what number would the next house in this street be?
- making choices – for example, which bike is the best?

Tips for building numeracy skills:

- Read/ tell stories with numbers – for example, 'Goldilocks and the three bears'.
- Play, counting, sorting and matching games.
- Sing number songs and rhymes.
- Change your tone of voice to describe concepts – for example, use a deep, loud voice to describe something big, or a soft, squeaky voice to describe something little.

Tips for teaching numeracy skills

- Use hands-on learning methods
- Incorporate visuals
- Integrate math games into math lessons
- Connect math concepts to everyday life.
- Allow pupils to explain their reasoning.
- Give frequent feedback and direction.
- Reward progress
- Personalize lessons
- Encourage teamwork
- Allow lessons to build on previous knowledge.

Suggestions for Improvement

The study made the following suggestions;

1. Teachers should be made to understand that imparting knowledge calls for passion and personalised learning should be encouraged as all children don't learn at the same pace.
2. It is necessary to incorporate more hands - on activities and project – based learning experiences during teaching.
3. Government are encouraged to provide educators with professional development opportunities (e.g by organising workshops and conferences) to enhance their STEM teaching skills.

Conclusion

Enhancing STEM skill acquisition at early childhood education, a better and successful future generation is developed, making educators to inspire curiosity while preparing children for future STEM careers. These strategies can address the challenges involved in STEM education and help to improve learning outcomes.

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