Science and technology in childcare

ASSIGN BUSTER

Introduction

This paper identifies the everyday concept in relation to science, a broad topic and the appropriate scientific concepts which can be introduced to the children. Using Slowmation as a digital resource, it can be used to develop to support the concept development and the storyboard to designate steps from everyday to scientific concepts.

The ‘ everyday concept’ identified

From the observations obtained from the first assignment, the everyday concept identified is that “ the plants are thirsty”, according to Ann’s theory as she waters the plants daily. From her understanding, the leaves are always thirsty and by watering on the leaves, it will not be thirsty anymore. Hedegaard and Chaiklin (as cited in Robbins, 2012) recommended that the most effective for learning happens when educators intentionally takes into children’s account. By identifying Ann’s everyday concept, I can then extend her understanding in scientific concepts through intentional and purposeful facilitation. This everyday concept can be utilized as a starting point for science experiences (Anderson, Ellis, & Jones, 2014).

Topic chosen and “ Scientific Concepts’

Based on the everyday concept which I have identified, Plants would be the broad topic for children to find out more. As children are active and competent learners (Stoecklin, 2012), this topic would encourage children to have hands-on interaction, play and discovery as they would be involve in planting little seeds, which lead to understanding the scientific concepts relating from their everyday concepts.

Children often began to ask questioning and engaging with natural and physical world which resulted in children constructing their own hypotheses from their everyday experiences (Anderson, Ellis, & Jones, 2014). These concepts which children had organized does not have to be replaced, instead, it can be rationalised through facilitation (Anderson, Ellis, & Jones, 2014).

These are the specific scientific concepts that I aimed for the children in my class to understand:

- Most plants need water, light, minerals, warmth, air,
- Plants get the water from their roots
- Seeds grow into plants with roots, stems, leaves, and flowers
- Some plants grow from roots
- A plant's roots use the soil to hold the plant in place. The plant can grow tall if it has a strong base.

I have revisited some of these scientific concepts to assist me in supporting the children's learning and develop it into digital teaching resource.

According to Science of Life Explorations (n. d.), it explains what a plant need for growth. Each segment describes the environmental factors affected the growth of a plant. Too much or too little of each factor will slow down the development of the plant.

To support Ann's learning of her everyday concept " plants are thirsty" and relating to the scientific concept " plants need water and sun to grow", I read up the factors affecting the growth of a plant and I learnt that too much water can make a plant die as plant's roots need space and air to breathe.

I also looked up “ How Stuff Works” to find out more about how water helps in growth of the plant. In my readings, I reaffirmed that plants take in water through their roots and plants need water to support them (Freeman, n. d.). Thus, in my preparation for my resource, I will include this science concept in my digital resource.

In addition, I also learnt that these scientific concepts are interlinked. To understand the growth of a plant, these are important factors which I hope the children will eventually understand as part of their potential learning progress.

Digital Resource

The digital resource that I would choose to develop to support and share this concept development would be to use slowmation. “ Slowmation” (abbreviated from “ Slow Animation”) is a simplified way of telling a story or explaining a concept that is played slowly at two second per second (Fleer & Hoban, 2012). I believe that by using ‘ slowmation’, I am able to share with the teachers on how this digital resource can be a pedagogical for refining their science teaching. Slowmation is being used as a method of encouraging teachers to begin to identify their children’s understanding in relation to their science topic which they are investigating (Keast, Cooper, Berry, Loughran, & Hoban, 2010).

Slowmation can be created through these five connecting representations (McKnight, Hoban and Nielsen, 2011). The first step is to write down notes from prior experiences, followed by using a storyboard to plan for animation

to making simple models or using cameras to captures of models and moving them manually and lastly to create the animation.

Although Slowmation is similar to clay animation and digital storytelling, it is easier to be implemented in a classroom and it displays the features like purpose, timing, orientation, materials and technology (Hoban, & Nielsen, 2012).

In relating back to the science concept, the growth of a plant can be narrated using Slowmation. In this case, I decide to pick a sunflower seed to demonstrate the growth of the plant. The purpose would be to explain on how a sunflower would grow from a seed. Children's knowledge gained on the things such as sunlight and water which a sunflower needed to grow can be narrated in the animation. Fewer photos will be needed as animation is played slowly. The orientation of the models are usually in 2D, hence, it can be placed on the table and makes it easier to manipulate while capturing the photos. The materials used for the animation are easily available as it can be dough, drawings, pictures or 3D objects such as rocks, leaves, or seeds. This will be further explained in the storyboard.

When teachers have gathered the children's understanding science concepts about plants, it can be added into the animation and explain it in the narrative form. The main idea of slowmation is that a narration can be added to explain a particular science concept while the models are animated as in a narrated flip book (McKnight, Hoban and Nielsen, 2011).

In a research done by Keast et al., (2010), they mentioned that Slowmation were most effective when the concept is self-contained and easy to

summarise and represent after a series of lessons. It is also suggested that teachers who were introduced to Slowmation had incorporated into their teaching had benefited their children's learning as it has helped them to better understand how their students developed their undemanding in their science concepts (Keast et al., (2010).

Storyboard – Reviewing on the scientific concepts based on the growing of a plant

Slowmation worked well as a review for the topic, taking in the major concepts of the topic (Keast et al., 2010). Taking into considerations from the everyday concepts identified, the storyboard described how the everyday concept leads to scientific concepts.

Based on their knowledge gained, the children can narrate the story. The story began where Ann likes to water the plants then to finding out how plants grow using sunflower seeds. They can use dough to make a sunflower or even used a real sunflower in the story. While introducing the tools for planting, the real objects can be captured to include it in the Slowmation. In the following sequence of the story, children can draw out each stage of the plant, until it turned into a sunflower. Each step is carefully planned in such a way that the information that is needed to be shared is drawn.

As the animation is play slowly at two frames per second, the children are able to view the process of the plant growing as part of the reflection. They will also explain the nutrients the plant need in order to growth and identifying the parts of the plant. To conclude the animation, a song about a little seed (refer to Appendix 2) can be added at the end of the story.

In this storyboard, it is also clearly explained what plants need in order for it to grow, how a tiny seed grow into plants with roots, stems, leaves and flowers by using a sunflower to demonstrate the scientific concepts.

Supporting Children's Further Learning of the Scientific Concepts

In addition to the digital resource, I would plan for an environmental project, in this case creating a garden to further enhance the environment and at the same time, the children would be applying the scientific concepts which they have learnt while embarking on this project. In addition to that, the children would also be exposed to learning about sustainable development.

Banks (as cited in Fleer, & Jane, 2011) reasoned that children should be practiced at thinking at a social, environmental, cost-effective, technical, moral and social level. While creating a garden to further enhance on the school environment, the children would further develop more scientific concepts such as growing root vegetables such as carrots, onions, garlic by placing these vegetables into the soil. The children will also be involved in technological thinking skills as they are thinking about their environment in school, designing and planning how they would want to create their garden. They will be using their imagination and creativity to create their garden. For example, the children may use materials they could use for their planters. This could an empty bottle, a container or even a tyre. Vygotsky (as cited in Fleer & Jane, 2011, p. 89) mentioned that " imagination is not just an idle mental amusement, not merely an activity without consequences in reality, but rather a function essential to life". The children also explore how to use gardening tools while doing planting.

While planning, designing meaningful experiences for the children, the Ministry of Education (MOE) in Singapore has developed the iTeach principles to set as a guide for educators to take into consideration during their preparation in engaging with the children in bringing in everyday and scientific concepts together. “ Teachers as facilitators of learning” (MOE, 2012) extended and scaffold the children’s learning through their abilities and experiences. This can relate to Rogoff’s three lenses of analysis on how educators can observe their children in school (Robbins, Bartlett, & Jane, 2006).

“ Children learn when they are engaged in play that enjoyable and thoughtfully planned” (MOE, 2012, p. 34). This statement describes that play is the main tool for children to explore and learn in the environment. When children are engaged in purposeful play, the children are involved in not just only play, but bringing in active participation of children exploring, developing and applying their skills and knowledge based on their cultural, interests and abilities (MOE, 2012). In relating back to the everyday concept identified, Ann’s interest was displayed as she was watering the plants and this led to exploring more scientific concepts such as plants gets water from their roots, and find out what plants need in order to grow.

As an educator, I have to constantly reflect on my teaching on how I can thoughtfully create stimulating and challenging environment that provoke children’s curiosity and sustain meaningful learning (Children’s Services Central, 2012). With “ intentional teaching” (Children’s Services Central, 2012) in mind, I would place materials and tools purposeful and deliberately for children to notice and make use of them. I would also carefully choose

the contextual learning environment for children to be engaged in. As my centre has a luxury of greenery space, it will definitely benefit the children's learning in this authentic learning context where children construct more everyday concepts and relating it to the scientific concepts making real and relevant to the real world (MOE, 2012).

Conclusion

As an educator, it is important for me to understand how much the child already knows, how I can enhance the learning potential by bringing in personal experiences and incorporating intentional teaching while making use of the cultural influences and context available. The learning does not end once the child knows; it should be a learning journey for the children as they apply the skills in the real world. For educators, we should make an effort to increase our knowledge in science and develop confidence in teaching science (Robbins, 2012). Using digital resource has definitely helped me in explaining science concepts and made it easier for children and teachers to understand.

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Appendices

Appendix 1

Appendix 2

Little Seed Rhyme

First you take a little seed

And plant it in the ground

Then you pour some water on

And let the sun shine down

And watch it grow and grow and grow and grow

Grow it up to the sun sun sun

And let it bloom and bloom and bloom and bloom

Flowers for everyone

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