



## The Use of Science Books and Children's Literature in the Primary Science Classroom

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### Abstract

Internationally, there have been a number of policy documents published focusing on identifying and implementing means of improving literacy skills, for example 'No Child Left Behind' or 'Race to the Top' in the United States, the 'Europe 2020' strategy; and a 'Vision for Literacy 2025' policy in the UK. All such reactionary policies were published as a result of declining literacy levels among both adults and children worldwide. The National strategy in Ireland to improve literacy among children and young people states that we need to prioritise literacy through positive interventions and integrating these skills across the curriculum [1].

Internationally published literature details how Science can be successfully integrated with literacy to teach Science concepts [2,3]. Under this framework Irish Primary Schools are currently introducing best practice methodologies in literacy teaching. Professional development courses are being rolled out to facilitate this strategy. However, there have been no specific models of professional development designed and implemented on how literacy skills can be effectively developed in the Primary Science Classroom.

This research was therefore carried out to investigate teachers' use of science books and children's literature in science lessons. Their experiences of and training received in using of children literature in Science lessons to enhance children's literacy skills was also investigated. A questionnaire was distributed to primary school teachers of varying teaching experience (N=25).

Findings from the research showed that many teachers depend on specific 'Science Books' in their lessons and the majority had never used everyday children's literature and stories before in science lessons. The main reasons for this were as follows: 1. No professional development or workshops available in this area; 2. the over crowded curriculum and 3. their lack of resources to design science lessons incorporating children's literature.

The results will be discussed in how this research can inform the design and development of future frameworks, guidelines and professional development courses for the integration and effective development of literacy skills in Science lessons.

### 1. Introduction: Primary Literacy and Science Education

The National strategy in Ireland to improve literacy among children and young people states that we need to prioritise literacy through positive interventions and integrating these skills across the curriculum [1].

With an increasing emphasis on developing children's literacy and numeracy skills and the increase in time allocated to numeracy and literacy instruction in schools, it is imperative that other curricular areas are not left behind and that teachers focus on developing literacy and numeracy skills beyond the primary English and Mathematics lessons.

Most recently research has been carried out in Ireland on how to increase the development of language and literacy skills in the primary Science classroom. For example, Liston (2015) carried out research on providing opportunities for dialogue and scientific inquiry through the use of puppets with pre-service primary schools teachers and qualified class teachers [4]. The study outcomes were very positive. From the comments of the children and teachers, it was found that the puppets provided more opportunities for productive talk and investigating, developing the children's scientific process skills when trying to solve the problem for their friend, the puppet: 'It was a great way to get them to develop their language skills and vocabulary' and 'Using a puppet generates more discussion with younger children' [4]. Minogue (2015) carried out research on the impact of using nursery rhymes in junior primary Science lessons [5]. Data from this intervention study found that the pupil's use of oral language and scientific inquiry increased over the course of the programme and their use of targeted scientific process skills also improved.

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The results of the above mentioned studies and from the researchers experience at continuous professional development (CPD) sessions found that the majority of participating teachers seldom think about introducing effective literacy strategies used in their English and other lessons into their Science lessons. These studies opened Irish teachers' eyes to new methodologies for the Science classroom with the aim of developing both the children's literacy and numeracy skills. Therefore, it was decided the focus of this study was to take a step back and explore what are the current practices and strategies being implemented with the aim of promoting and developing literacy skills in Irish primary Science classrooms.

## 2. Research Focus

This research involves an investigation into teachers' use of science books and children's literature in science lessons. Their experiences of, opinions on and attitudes towards the use of children literature in Science lessons to enhance children's literacy skills was also investigated.

## 3. Methodology

A questionnaire was distributed to a random selection of primary school teachers around Ireland of varying teaching experience (**N=25**). The questionnaire in this study included a mix of mainly closed and also some open-ended questions gathering qualitative and quantitative data.

## 4. Results

### 4.1 The Use of Specific Pupils Science Books

The teachers were asked *'do your pupils have a book for science in your class?'*

**11 out of the 25 teachers used science book** with 14 preferring not to have a specific science book for their children, stating they like to find resources from a variety of sources, using more teacher resource books rather than pupil books as many stated they found the books to be irrelevant and included more colouring activities than anything else. Their comments included:

*'Lots of teachers resource books instead'*

*'Some pages are just irrelevant and more suitable for colouring'*

Many felt they wanted to focus on carrying out the experiments that fill in workbooks.

*'We try not to use so many workbooks, more hands-on instead'*

*'Felt it was better to use experiments. Books are more like colouring books'*

## 5. The Use of Children's Literature and Story Books in Primary Science Lessons

The teachers were asked *'Have you ever used children literature/story books in your science lesson?'*

**19 out of the 25 teachers had never used children literature/story books.**

The teachers were asked to explain their answers. Many of their comments mentioned the main reasons why they have never used such a teaching methodology were as follows:

1. No professional development or workshops available in this area;
2. The over crowded curriculum;
3. The lack of resources available to help to design science lessons incorporating children's literature.

Of the 6 that used the books they all stated that they used the books: to introduce a topic and to provide a background or context to a topic

The teachers gave examples of books that they used. Interestingly it should be noted that all the books mentioned were used to teach biology i.e. animal characteristics and development.

The books mentioned were as follows:

- **Day Monkey**
- **Night monkey**
- **Hermit Crab**
- **Life Cycle books**



- **The Hungry Caterpillar**

The teachers were asked 'Have you ever used fairy tales in your science lesson?'

**22 out of the 25 teachers had never used children literature/story books.**

Of the 4 that used the fairy tales they used them to teach the topics of: properties and characteristics of materials and materials and change i.e. specifically mentioning:

- **The Three Little pigs**
- **Humpty Dumpty**
- **Pat a Cake**
- **The Hungry Caterpillar**

## **6. Literacy Skills in the Science CPD Courses**

The teachers were asked 'Have you ever attended a Science CPD session that focused on the promotion of literacy skills in the primary science classroom?'

**23 out of the 25 teachers stated that there was not an emphasis** placed on Literacy skills in any Science CPD courses they had attended.

When they were asked further about their experience of Science CPD sessions focusing on literacy skills, the results were disappointing:

- **Only 1 out of the 25** had attended a CPD session on developing **oral language skills** specifically in Science lesson and it was an online course.
- **No teacher out of the 25** had attended CPD session on developing **writing skills** specifically in Science lessons.
- **No teacher** had attended a Science CPD session on developing **reading skills** specifically in a Science lesson.

**100% of the teachers stated that they would attend a course focusing on developing literacy skills (reading, writing and oral language) in primary science lessons if it was offered to them.**

## **7. Discussion**

It is clear from the results that high-quality Science CPD and supports are needed which focus on how science lessons can be effectively used in developing children's literacy skills.

These CPD sessions should focus on the delivery of inquiry based Science teaching in primary classrooms incorporating collaborative, dialogic and higher order literacy skills in oral language, reading and writing.

If researchers in Literacy Education and Science Education in Ireland work together on developing an effective model of curricular integration, Integrating Literacy in Primary Science Education, Ireland could lead the way internationally in this space.

From the teachers comments the following need to be addressed in future Science CPD sessions:

- Teachers **lack of time** to teach all the requirements of the over-crowded curriculum and the requirements of the National Literacy and Numeracy Strategy was an issue which must be addressed through the exploration of best approaches and practices to school planning when developing integrated approaches to the curriculum and primary Science
- The **development of resources** that can be used across the curriculum and for the integration of 1. Oral Language, 2. Writing Skills and 3. Reading Skills in Science using methodologies that have been proven to be effective in English lessons.

## **References**

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