Representations of the celestial bodies in fairy tale texts

Dimitra Kazantzidou 1, Konstantinos T. Kotsis 1*

1 Department of Primary Education, University of Ioannina, Ioannina, GREECE
*Corresponding Author: kkotsis@uoi.gr

Citation: Kazantzidou, D., & Kotsis, K. T. (2023). Representations of the celestial bodies in fairy tale texts. Aquademia, 7(2), ep23005. https://doi.org/10.30935/aquademia/15442

ABSTRACT

This work identifies and records the errors and inaccuracies in representing celestial bodies in fairy tales. It also presents the alternative ideas that may arise in children due to these inaccuracies and errors. The qualitative content analysis examined the texts of 55 classic fairy tales by authors Andersen, Perrault, and the Brothers Grimm. The results showed that the Moon, the Sun, and the Stars are not represented based on the scientific standard. Finally, the common characteristics of errors and inaccuracies and ways of using these fairy tales in teaching sciences are presented.

Keywords: misconceptions, fairy tale, celestial bodies

INTRODUCTION

Children’s and adults’ perceptions of astronomy have been the subject of research by many researchers. The results show that children (Vosniadou & Brewer, 1994) and adults (Brunsell & Marcks, 2004) have alternative ideas about celestial bodies. Alternative ideas and beliefs about the natural world are developed from everyday experiences such as the senses, language, cultural background, peers, mass media, teaching, and books (Duit & Treagust, 1995; Kotsis, 2005).

Research in books of children’s literature, fiction, and non-fiction concluded that the celestial bodies, specifically the Moon, are only sometimes represented based on the scientific standard. In more detail, Rice and Rainsford (1996) examined ten books of children’s literature on the Moon to identify examples of alternative ideas or information that could contribute to their development. The content analysis found errors in the texts and the illustrations about the Moon’s size, shape, composition, position, and distance from the Earth. In three books, the Moon was presented with anthropomorphic elements. Trundle and Troland (2005) and Trundle et al. (2008) analyzed children’s literature books that had the Moon as a theme or used it in illustrations. They concluded that many books contained errors and inaccuracies, such as inaccurate phase sequences and incorrect figures. Many books also promoted the alternative idea that the Earth’s shadow causes its phases.

Empirical studies show that reading inaccuracies and errors about the Moon in children’s literature books creates alternative ideas in children. For example, children believe that the Moon is shrinking in size, is an earth-like place, or has human characteristics (Kazemek et al., 2004). The research of Kazemek et al. (2004) agrees with the position of Ault (1984), who considers that the alternative ideas about the phases of the Moon originate from its incorrect representation in children’s literature books.

Bettelheim (1995) observed that children of all stories prefer fairy tale, as it provides them with ways to deal with their problems and worries. However, research on first graders concluded that even fairy tales could lead to alternative ideas in science subjects (McClelland & Krockover, 1996). From the literature review, research was not found that examines fairy tales in terms of accuracy in representation of celestial bodies.

The present research, therefore, aims to inform educators, parents, and researchers about the common inaccuracies in the representation of celestial bodies in the fairy tales of Andersen, Perrault, and the Brothers Grimm. The specific fairy tales were chosen as they have been translated into many languages (Zipes, 2015) and have been in contact with children worldwide. More specifically, the research questions of the study are the following:

1. What are the inaccuracies and errors in representing the celestial bodies?
2. What possible alternative ideas may be generated in children due to these inaccuracies and errors?

METHODOLOGY

The sample was collected using purposive sampling. Initially, a search was done with the terms: Grimm, Andersen, and Perrault in the catalog of the Municipal Library of Veria.
The definition of the category was formulated to select the extracts from the texts and define the categories. Specifically, the definition was defined as any reference to the texts that do not represent the celestial bodies in a scientifically acceptable way. Then the level of abstraction was formulated, that is, how limited the content of the categories will be. This, then, was defined as the celestial body not accurately represented, such as the Moon.

Finally, all texts were entered into the software to be coded. When a passage was found with inaccuracies or errors in representing a celestial body, a new category or an entry was made in a previous one. To check the reliability and establish the category system, the agreement in the coding by the same researcher at two different times (intra-coder agreement), specifically after six months, was used.

RESULTS

From the analysis of the fairy tales of Andersen, Perrault, and the Brothers Grimm, a total of 115 passages with errors and inaccuracies about the celestial bodies were recorded. Specifically, the Moon, the Sun, and the Stars are the celestial bodies that are not accurately represented in the text of fairy tales. More specifically, 67 passages refer to the Sun (59%), 29 to the Moon (26%), and 17 to the Stars (15%).

Three categories of errors and inaccuracies emerged, which are given in Table 1. Table 1 includes the title of each category, the definition, examples from the texts, the scientific view, and possible alternative ideas. Scientific view provides the prevailing scientific view of the Moon, the Sun, and the Stars. Alternative Ideas provides ideas about the celestial bodies’ children may develop due to these errors and inaccuracies.

CONCLUSIONS

The results show that the fairy tales of the present research contain errors and inaccuracies about celestial bodies. Specifically, the Moon, the Sun, and the Stars are not represented based on the scientific standard.

These results agree with previous research results. Specifically, content analysis of children’s knowledge books, fiction, and non-fiction, documented inaccuracies about the Moon and the Sun (Rice & Rainsford, 1996; Sackes et al., 2009; Trundle et al., 2008). In more detail, the inaccuracies found in the tales of the present research about the Moon were also recorded in the research of Rice and Rainsford (1996) and concerning its shape, position, and distance from the Earth. Also, in the research of Rice and Rainsford (1996) and Sackes et al. (2009), the Sun and the Moon appeared with anthropomorphic features, as in fairy tales of present research.

The individual characteristics of the errors and inaccuracies recorded are based on observational data. For example, the Moon is described as self-luminous, moving up and down in the sky or round. The Stars also appear to be stationary in the sky. This is because when observing the night sky, the Stars give the impression that they are stationary.
Furthermore, the succession of day and night is connected with the Sun’s apparent movement. Some errors and inaccuracies also go hand in hand with theories of the past. Thus, the passages about the movement and position of the Sun and other celestial bodies correspond to the geocentric model. According to this, all objects in the sky that are visible to the naked eye revolve around the Earth. Among the advocates of this system were Aristotle and Ptolemy.

The results of the empirical study by McClelland and Krockover (1996) show that the alternative ideas built from
children’s books can be reconstructed with activities that cause cognitive conflict and lead to conceptual change. Also, generating alternative ideas can be prevented if children are encouraged to formulate questions and think about the book’s content (Sackes et al., 2009). Therefore, activities such as observations or educational software about celestial bodies could lead to the recognition of inaccuracies in the text of fairy tales and the construction of scientific ideas. Moreover, comparing the tales with accurate books of knowledge on celestial bodies could lead to the Cretan approach to the tales and the identification of inaccuracies and errors.

Finally, the present study was purely bibliographic, and the impact on children’s ideas and knowledge is absent. Therefore, a suggestion for further research is the empirical study of the effect of fairy tales on children’s knowledge of celestial bodies.

Author contributions: All co-authors have involved in all stages of this study while preparing the final version. They all agree with the results and conclusions.

Funding: No external funding is received for this article.

Ethics declaration: Authors declared that ethical approval was not required for this study as it did not involve the use of sensitive or identifiable personal data and did not pose any risk to any participants.

Declaration of interest: The authors declare that they have no competing interests.

Availability of data and materials: All data generated or analyzed during this study are available for sharing when appropriate request is directed to corresponding author.

REFERENCES


Bonidis, K. (2004). The textbook’s content as an object of research: A longitudinal examination of the relevant research and methodological observations. Metaichmio.


Mayring, P. (2014). Qualitative content analysis: Theoretical foundation, basic procedures and software solution. In A. Bikner-Ahsbahs, C. Knipping, & N. Presmeg (Eds.), Approaches to qualitative research in mathematics education (pp. 365-380). Springer. https://doi.org/10.1007/978-94-017-9181-6_15


