



Children's Creative Writing using lexical diversity indices

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Abstract

In the field of education, especially in primary school, we can favor the development of creative thinking and written expression of the first grades pupils, using teaching (didactic) practices of selected fairy tales, with creative dynamics. Through fairy tales we encouraged children to produce original ideas, free their imagination and express themselves through creative writing. The selected texts written by the pupils as well as the criteria for creativity evaluation digitized were submitted to judges-educators and subjected linguistic processing. In this paper we present a methodology, correlating judges-teachers' evaluation with the linguistic processing statistics, comparing fairy tales as for their creative potential and, finally, comparing creativity of different aged pupils based on the same fairy tales. The creativity criteria used are seven: the four of the [18], [11] rubric plus the three classic ones [5],[16], [12]. Results of our statistics comprise a k-means clustering of tales, using all seven creativity indices (rubric), designating their relevant didactic practices. An important result is that a very similar clustering of tales is produced based on either the seven creativity criteria mentioned or the percentage of the part of speech (POS) used by the pupils. The above results confirm our initial hypothesis that some aspects of creative writing can be fairly successfully evaluated using linguistic features, [10]. Moreover, our research results can be further exploited in the development of automatic assessment systems and automated content analysis of fairy tales, written by primary school pupils.

Keywords: *Creative writing assessment, fairy tales, linguistic features*

1. Creative Writing and Expression in the Classroom

When children come to school, they "carry" with them an inner need to express themselves orally, which combined with children's love of fairy tales and stories, a strong foundation for emotional engagement and spiritual stimulation could be established.

The child in Primary School has to work creatively, to early cultivate a personal relationship with the words and the way to combine them to form a homogeneous whole, without missing the joy from other actions such as storytelling, theatrical or drawing representation of the fairy tale. Of course, children enjoy benefit in many ways when they get actively involved with children's literature: sharing experiences from a book in small or large groups may lead to essential conversations and writing applications.

As a main procedural approach in primary school, it offers liberation of thought and flexibility of personal experimentations on writing ways, it frees self-expression and presents pupil's personal ideas, emotions and feelings [16], [17]. Creative writing as an educational activity should be "guided by the instructor" [15], who has to be flexible and to provide a trigger for the "liberation" of the imagination, to encourage pupils, to suggest and also motivate them in creative written expression [9].

2. Learning through fairy tales

The full of exaggerations and contradictions fairy tale is to entertain, to charm, to teach in an indirect way, above all to reach the Aristotelian catharsis by escalating tensions: to relieve and to purify. It has a simple style, stereotype expressions of beginning and end, deliberate repetitions, it provides its interior for explosive ventures and turnovers.

We can say that fairy tale school reading develops creativity, extends thought, train memory and exploits children potentiality, nourishing dialogue, language expression and semantic abundance of words, fostering pluralism of opinions, cultivating a co-operation and teamwork climate. In other words, it contributes to the child's overall psychokinesis, cognitive, perceptual and emotional development [4], [14], [6].

3. Assessment of Creative Writing by Judges and Language Tools

3.1 Creative Tales



In order to confirm and support some theoretical approaches, we conducted a field research in the classroom. Through specific **creative tales**, using established **teaching practices**, we encouraged children to express themselves through creative writing. Fairy tales written by B and E grade pupils were selected, from different teaching practices.

We compared full of fantasy children's stories such as "the dog that did not know how to bark". The aim was to find out whether pupils would contribute to the story creating images, sounds, characterization of the hero, how well formed and aesthetic their narrative could be, whether quantity and types of ideas would be important, enriching their text, and how original their story could be, written at the beginning of the school year. Under the same aim we presented a fairy tale "the clean wolf and the dirty pigs", reverting the well-known story, aiming at bringing about new elements to it.

Furthermore, children of the B and E grade working as a group on an invented narrative of the Rodari "the planet of truth", presented ideas on how to give life to an invented "small-human" [17], made up of material other than that of a human (such as glass, plastic, wood, ice cream, paper, iron, etc) and guide the humanoid to act, to develop relationships and hit by accidents appropriate to the material chosen.

Finally, responses of the B and E grade pupils relevant to the Rodari fairy tale "Rinaldo adventure" were organized at the end of the school year. Without an end for this story pupils were asked to change parts of the story, using their imagination, trying to act as writers and giving their own end version of the story.

3.2 Judges and Creativity Criteria

The use of judges for the evaluation of creative writing, writing in general, is considered as an established methodological approach [1], [2], [20], [7], [8], [3]. Following this practice, six experienced school teachers were selected to act as **judges**. Creative criteria with sample assessing examples were presented to them and explained in detail.

Some of the pupils written story versions were digitized and given to judges for an **assessment**, based on the following **creativity criteria**: Quantity of Ideas (Cognitive Ability), Types of Ideas (Cognitive Flexibility), Rarity of Ideas (Originality of Thought), Picture / Verbal Iconification, Sound / Verbal Audio Description, Character Description / Characterization, Narration / Story Telling. The former three are referred to by various works [5], [16], [12], [13], [19]. The four latter criteria [18], [11], despite their relative difficulty in utilization, provided interesting data.

Each judge separately processing the material, recorded his evaluation giving one of the four grades for each fairy tale and for each student: *Excellent (4)*, *Good (3)*, *Reasonable (2)*, *Poor (1)*.

To integrating judges' assessment for statistical processing, we tested inter-rater agreement by taking into account assessments which are in agreement more than or equal to 70%. For each student, every fairy tale and each creative criterion separately, the median value of the resulting evaluation of these judges was calculated. Following the same inter-rater agreement process, for the "collective creation" of pupils of the same grade (age group), we calculated the median of the assessments of judges who agree 70% or more for all pupils of that grade, per creativity criterion and per tale. The resulting numbers were normalized from 0 to 1.

3.3 Linguistic Processing

The digitized texts were also tested by **linguistic processing** to record for each pupil and every fairy tale under consideration the following language characteristics [18], [11]:

- Absolute **number** and **percentage** of **lemmata** per part of speech (names, verbs, adjectives, adverbs, conjunctions, pronouns, prepositions, articles, etc.), where all lemma types are taken into account.
- **Percentage of lemma types** per part of speech (names, verbs, adjectives, adverbs, etc), i.e. each lemma is recorded once, irrespective of its number of occurrences.
- **Percentage of apex lemmata** (the words that appear only once), per part of speech (names, verbs, adjectives, adverbs, etc.).

In this paper we present results based on both content words (names, verbs, adjectives and adverbs) and functional words (prepositions, conjunctions, articles, etc.), but the apex lemmata.

For calculating the percentage of the word types in the text of each pupil for each fairy tale, the lemma of each word was found (using the ILSP lemmatizer) and the unique types were identified, where each lemma is recorded once irrespective of the number of its occurrences. Then, the percentage of the types and the unique types was calculated for all the words in their relevant grammatical category (ILSP-<http://nlp.ilsp.gr/soaplab2-axis/>).



The values of all parameters, in tables, were normalized to the number of students in each age group and, if applicable, to the number of words or sentences per age group, for comparison.

3.4 The Research Questions

Central questions that initiated and led this research, for which an initial answer is attempted in this paper, is the correlation of Fairy Tales and Age Groups by means of creativity criteria and linguistic parameters. More specifically:

- Similarities between **Fairy Tales / Teaching Practices**. Namely, whether there is a difference in pupils' creativity depending on the kind (subject, teaching practice) of the fairy tale. (*Figure 1, Figure 2*)
- Correlating **Age Groups**. Namely to compare creativity of different age pupils, using creativity criteria and linguistic parameters. (*Figure 3*)
- Clustering of Fairy Tales, using creativity criteria and linguistic parameters. (*Figure 4*)

4. Conclusions

Observing Figure 1 we conclude that characteristic is the "Small Human" fairy tale written by the pupils of the Grade B (BTA12), whose evaluation is just as excellent in character description and story (narration) as that of the Grade E pupils (ETA17), while it is assessed as average only in the image and voice criteria. Almost identical pattern is found for the "Rinaldo" fairy tale (BTR13, ETR19)! The evaluation of the fairy tale "Wolf" (BAL10) is found below average except in story (narration) in which is assessed as 0,7. The "Dog" (BAS11) in image and story (narration) is assessed over 0,7 and average in voice and character description.

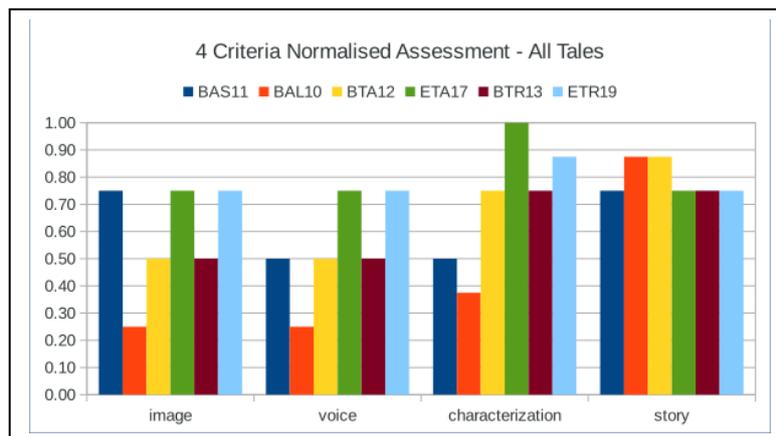


Figure 1: A noticeable difference is presented in assessing tales of all age groups (B and E) using image (picture) and voice (audio) criteria. Similar figures are related to the criteria story (narration) and mostly to characterization (character description).

Based on Figure 2 we observe that the fairy tale "Dog" (BAS11) is assessed as almost nil, whereas the "Wolf" (BAL10) is assessed as average as for the Rarity of Ideas. The assessment of the fairy tale "Small Human" for both age groups (BTA12, ETA17) and that of the "Dog" (BAS11) are assessed above 0,7, reaching the maximum value in all the criteria, as is found for the "Rinaldo" of B grade (BTR13)!

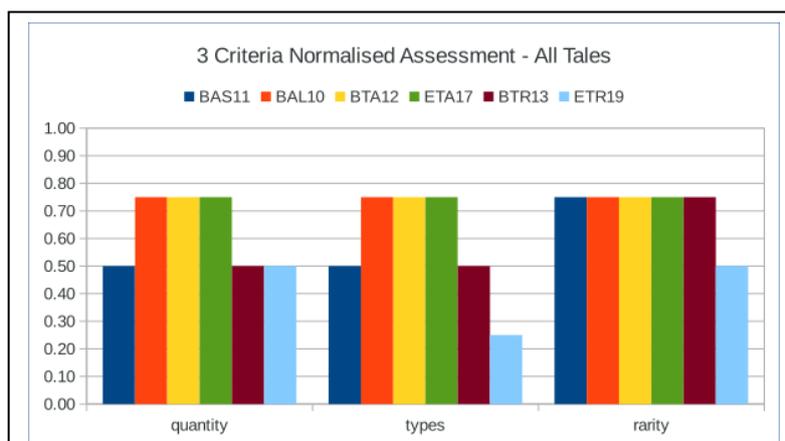




Figure 2: A comparative assessment of almost all tales is presented using these 3 criteria

Comparing the assessment of the same tale (“small human”), using all 7 creative criteria along with percentage of lemmata, we observe (Figure 3) a high similarity between age groups. A comparative result emerged comparing all relevant tales using all creativity criteria and the linguistic parameters lemmata types.

Correlations	B-average ETA	E-average ETA
B-average ETA	1	
E-average ETA	0.97	1

Figure 3: High similarity in the assessment of tale “small human” of the two age groups, using all creativity criteria and lemmata types.

Considering clustering of all fairy tales based on all 7 creativity criteria in combination with linguistic parameters (lemmata types) we find (Figure 4) that Fairy tale "Wolf" forms a distinct cluster (cluster 3), while fairy tale "Dog" belongs to the same cluster as "Rinaldo" and “Small Human” (LITTLE_HUMAN) fairy tales of the E Grade (cluster 2). “Rinaldo’ and "Small Human" of Grade B form their own group (cluster 1).

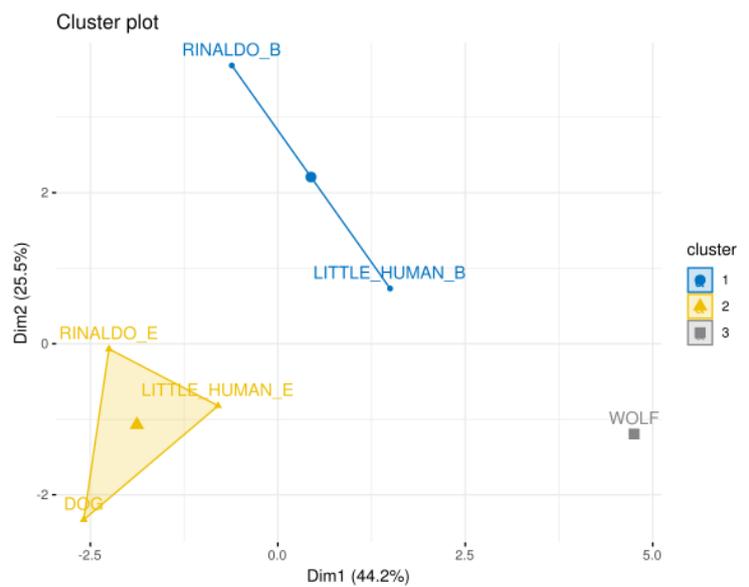


Figure 4: 3 distinct clusters emerged, differentiating tales, using all 7 creativity criteria and either percentage of lemmata or lemmata types.

As we can see differentiation between fairy tales and ages is depended on the creative criteria and / or the linguistic parameters applied. The above results confirm our initial hypothesis that some aspects of creative writing can be fairly successfully evaluated including some linguistic features.



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