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STUDY OF A METHODOLOGY FOR CREATING A FANTASY STORY USING TRIZ

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Abstract: *With the development of digital storytelling platforms and contents IP (Intellectual Property) businesses in Korea, the demand for fantasy stories that are both aesthetically pleasing and entertaining has been increasing. In this re-search we propose a methodology for creating fantasy stories using TRIZ's systematic problem-solving process by analyzing A Wizard of Earhsea, one of the fantasy classics, and "The Infinite Wizard", a Korean popular web-fiction, using V. Propp's morphological analysis of the fairy tale. We found that a magic is one of the key factors that determine the aesthetic quality and fun of the fantasy stories, because the magic functions as a problem-solving tool in "struggle → victory" and "difficult task → solution" types of the fairy tale, which forms the axis of structure of the fantasy stories. Based on this analysis, we suggest that TRIZ's problem-solving process can be used as an algorithm to systematize the process of making creative tasks and innovative magical means in fantasy stories.*
Key words: *Fantasy Story Creation, Inventive Problem Solving Algorithm, TRIZ.*

1. INTRODUCTION

Wattpad of Canada is well known worldwide as a storytelling platform on which Internet users can freely post and share their own stories on the web. In Korea, the PC (Personal Computer) communication literature community developed in the 1990s, and the storytelling platform expanded and was industrialized, centered on the large portal site in the mobile technology era of the 2010s. According to a report released in January 2018 by the Korea Creative Content Agency (KCCA), a government-affiliated organization, the market size of the storytelling platform has grown rapidly from 2014, which marked the beginning of the industrialization, to 2017, with an average annual growth rate of 129.6%. In particular, Kakao Page, the leading storytelling platform in Korea, was estimated to exceed $ 160 million in annual transactions at the end of 2018; as of 2020, the cumulative number of subscribers is more than 20 million and the cumulative content is more than 5,000 and growing [1]. Kakao Page had the largest corporate value among all of Korea's past Internet initial public offerings (IPO), with Korean stock market listing expected in 2020 (Korean Economy, April, 27, 2019). Thus, the storytelling platform in Korea is building a successful business model and has grown dynamically, attracting great attention from the content industry. In particular, the content IP (Intellectual Property) business has been activated, producing various types of derivatives, such as movies, digital games, and AR (Augmented Reality) based on popular original contents that have received many views on a platform.

Currently, the most popular genre on Korean storytelling platforms is fantasy. According to the survey of the previous KCCA report, 93.3% of Korea's major storytelling platform companies ranked the fantasy as the most viewed genre. As of April 2020, in the million-seller web-fiction category with more than one mil-lion subscribers provided by Kakao Page, about 50% of the total are fantasy fiction [2]. Looking at the characteristics of Korean web novels, the series of episodes should be short enough to read in minutes, because Koreans usually use a mobile medium, such as a smartphone. In addition, the story should be easy and light, and have a familiar narrative structure that readers can understand immediately [3].

Thus, fantasy fiction with a simple and schematic narrative structure of familiar myths or fairy tales is likely to be the most suitable work for capturing the readers of the digital generation with its unique fantasy imagination.

G. Altshuller, founder of TRIZ, worked on the science-fiction stories with TRIZ tools for developing fantasy imagination, such as Fantogram and the register of fantastic ideas [4]. It is well known that he himself was a science-fiction writer. Whereas science fiction has a relative complex narrative structure based on scientific and rational logic, fantasy fiction is based on mythical imagination and has a simple narrative structure pattern which makes it easy for ordinary readers to enjoy and even create their own. This seems to be why fantasy fiction became the most popular content on digital storytelling platforms in Korea.

However, with mass production of stereotyped fantasy novels, fantasy fiction began to degrade, which drove readers away. Korean literary critics pointed out that it is necessary to improve the aesthetic quality of fantasy fiction in order to strengthen its content competitiveness, and various studies have been conducted on successful global fantasy contents, such as the Harry Potter books and Lord of the Rings.

Ursula Le Guin's A Wizard of Earthsea, known as one of the world's fantasy classics, has both excellent aesthetic quality and philosophical insights, while having the typical schematic structure of fairy tales [5]. It is interesting that the concept of magic in this story was defined as a method for understanding and changing the world, much as multi-screens in TRIZ's methodology is defined as a way to understand an artificial system, and identify its real problems and resolve them. On the other hand, the magic in the fantasy web-fiction "The Infinite Wizard," one of the Kakao Page's million sellers, is defined as a means for exploring phenomena based on human insight and scientific knowledge. In these fantasy stories, magic was expressed as the power that "must follow knowledge, and serve need" [6]. Both cases show that TRIZ is very useful for developing fantasy content products with a high potential for the content IP business.

Our aim in this research is to propose how to use the concepts and tools of TRIZ for creating a fantasy story. For this purpose, as an introduction to ongoing methodology development, we analyzed these two elegant and popular novels by using TRIZ. For TRIZ's non-technical application, we also suggest how it may be effectively used to develop popular and commercially available fantasy content for developing creative educational purposes.

2 RESEARCH METHODOLOGY

2.1 Construction of Fantasy Narratives Based on Vladimir Propp's Morphological Method

Among the subgenres of fantasy, the fairy tale is a typical fantasy genre related to magic. J. R. R. Tolkien [7], the author of the classic fantasy novel Lord of the Rings defined a fairy story as a narrative set in the 'Second World' governed by magic, the reality of which is based on the readers' 'literary belief', not on the reality of a 'Primary World', and he identified a fairy story with a fantasy story. Thus, according to Tolkien, the basic concept in the fantasy story is a magic world with probabilities in the narrative (inner reality), and the completeness of the fantasy story is directly related to how coherent this magic world is. Based on Tolkien's reference to a fairy story, in this paper we define a fantasy story as a fairy tale depicting a magic world with inner reality.

The work of Russian formalist Vladimir Propp, an important study of the fairy tale, was research that discovers the laws for constructing fairy tales by analyzing 100 Russian fairy tales using a function approach. Identifying the components of fairy tales and classifying them into constant and variable elements and investigating the relationships between the elements, he defined a fairy tale as a story that is organized in terms of 31 functions performed by 7 characters in sequential order [8].

- According to V. Propp, the fundamental, constant elements of the fairy tale are the character's actions, which are the functions of the characters. There is only a limited number of functions, which are arranged sequentially and regularly. These functions determine the structure of fairy tales. Because of these

features, fairy tales can be sorted into certain types [8]. Table 1 shows the 31 functions of characters that are the fundamental components of the fairy tale.

Table 1

V. Propp's Thirty-One Functions of Characters [8].

Definition of Function (Designation)	
1. absentation (β)	17. branding or marking (J)
2. interdiction (γ)	18. victory (I)
3. violation (δ)	19. the liquidation of the initial misfortune or lack (K)
4. reconnaissance (ε)	20. return of the hero (↓)
5. delivery (ζ)	21. pursuit of the hero (Pr)
6. trickery (η)	22. rescue of the hero (Rs)
7. complicity (θ)	23. unrecognized arrival of the hero (°)
8. villainy (A) / 8a. lack (a)	24. unfounded claims of a false hero (L)
9. mediation, the connective incident (B)	25. difficult task (M)
10. beginning counteraction (C)	26. solution (N)
11. departure of the hero (↑)	27. recognition of the hero (Q)
12. the first function of the donor (D)	28. exposure of the false hero or villain (Ex)
13. the hero's reaction (E)	29. transfiguration of the hero (T)
14. provision or receipt of magical agent (F)	30. punishment of the false hero or villain (U)
15. spatial transference between two kingdoms; guidance (G)	31. wedding (W)
16, struggle (H)	

Fig.1 is the general structural patterns of the fairy tale proposed by Propp [8].

$$\text{ABC} \uparrow \text{DEFG} \quad \frac{\text{HJIK} \downarrow \text{Pr-Rs°L}}{\text{LMJNK} \downarrow \text{Pr-Rs}} \quad \text{QExTUW*}$$

Fig. 1. There are four variable schemes without the functions of the preparatory sections(β-θ). (1) scheme including moves with struggle(H) → victory(I). (2) scheme including moves with difficult task(M) → solution(N). (3) scheme including both moves with H → I, which develop first, and M → N, which develops next. (4) scheme without either H → I or M → N.

V. Propp's idea of the patterning of the fairy story structure and the law of its composition seems to imply that anyone can easily create a fantasy story according to this pattern and law. This, however, does not mean that it is easy to create an interesting and creative story.

The fairy tale, according to Propp, has two contradictory properties, i.e., multiformity and colorfulness, but, on the other hand, also uniformity and repetition [8]. If the uniformity and repetition of the fairy tale are related to the functions of characters as the constant components of the fairy tale, multiformity and color-fulness are related to the diversity of the ways in which functions are realized as the variable components, which determine the various themes of fairy tales. Propp's hypothesis implies that the problem of making interesting and creative fantasy stories is a problem of how to transform the means of implementing functions into something interesting and creative. At the same time, it is important that the combination of its variants must maintain the reality of the 'Second World' of the fantasy story, along with narrative coherence.

2.2 Creation of Various Magical Means in Fantasy Stories using the TRIZ Concept

Propp's methodology has inspired much research on the development of the automatic story-generation systems that have become active in the era of Artificial Intelligence [9]. Actually, software has already been developed and commercialized (Dramatica, Power Structure, etc., in English, and Storyhelper in Korean). One commonly used method in this area is the CBR (Case-Based Reasoning) method, which is to build a database of cases of existing works and to extract data as needed [9-11]. In the field of engineering research, at this moment, computer systems are being developed so that all the narratives of the story are automatically generated at the sentence and text level, but in practical areas, the commercial software is used just as a support tool for authors to provide the data and information needed to create stories. These phenomena show that data and databases are just as important as the author's imagination for creating stories.

As described above, the main issues in creating fantasy stories are to build the magic world with an inner reality and to create various ways of implementing the functions, while generating the necessary data for doing so and using it effectively and productively.

The fantasy story is about the adventure of a human in the magic world [7], a hero who tries to overcome misfortune or lack using magic tools [8]. Thus, the magic in the fairy tale symbolizes the mysterious power of human

desires and need. This feature of magic, as well as the various novel forms of its expression, has much influence on the fun and attractiveness of fantasy stories. According to Propp's analysis, as shown in Fig.1, the basic pattern of the fairy tale can be di-vided into the struggle → victory type and the difficult task → solution type, while magic ('magic agent') is used as a method or a tool for solving the problems during these processes. As Propp stressed, the difficult task is one of the favorite elements in fairy tales [8].

Therefore, if the problematic situation described in these types turns into creative and innovative problems, and a creative solution means can be used instead of a hero's mysterious power, a novel and creative story can be created. This makes it clear that TRIZ's problem-modeling method and its tools for problem solving are very useful for creating fantasy stories.

According to G. Altshuller, creative and innovative problem solving, such as invention, can be achieved by organized and controlled thinking processes, which can be structured as a systematic thinking algorithm [12]. Although the main subject of TRIZ's research is engineering systems, G. Altshuller [12] emphasized that the algorithm of thinking can be applied creatively to all spheres of human activity, including art.

- G. Ivanov [13], systematizing the basic concepts and problem-solving techniques of TRIZ's methodology, which have been improved and developed through Altshuller's various works, explained the steps of TRIZ's problem-solving process and its main tools as outlined in Table 2.

Table 2

TRIZ's Main Steps for Problem Solving and Problem-Solving Tools [13]

TRIZ's Problem-Solving Process Steps	TRIZ's Main Problems-Solving Tools
1. Systematic analysis as multi-screens(9-windows), cause-effect chain analysis	(1) Information databases, such as 40 inventive principles, effects
2. Formulation of IFR	(2) Su-Field analysis
3. Identification of Contradictions	(3) Standards
4. Resolution of Contradictions	(4) Psychological operation to overcome thinking inertia

Since the creating of a fantasy story is transformed into an inventive problem-solving process, in order to create innovative and interesting ways to implement the functions that enable the hero achieve his goal in the magical world, the main concepts and tools of TRIZ can be applied to this process to generate ideas in accordance with TRIZ's problem-solving algorithm. For instance, for the difficult task → solution (M → N) type, Propp divided examples of difficult tasks presented in 100 Russian fairy tales into 11 groups, such as 'ordeal by food and drink', 'ordeal by fire', 'riddle guessing, ordeal of choice' [8]. It is likely that such a task can be represented as a contradiction by TRIZ's problem modelling. For example, 'ordeal by fire: to bathe in a red-hot iron bathhouse' is transformed into a physical contradiction like it should be hot to bathe under the task condition, and at the same time it should be cold in order not to burn while bathing. Once a difficult task is identified as a contradiction, the TRIZ's problem-solving tools, such as 40 inventive principles or separation of contradictory demands, can be used for creating various means for 'provision or receipt of magical agent' (F) and 'spatial transference between two kingdoms, guidance' (G), which functions as a tool or method to help the hero solve the difficult task.

Figure 2 shows an example of how to use TRIZ' concepts and problem-solving tools to create a fantasy story.

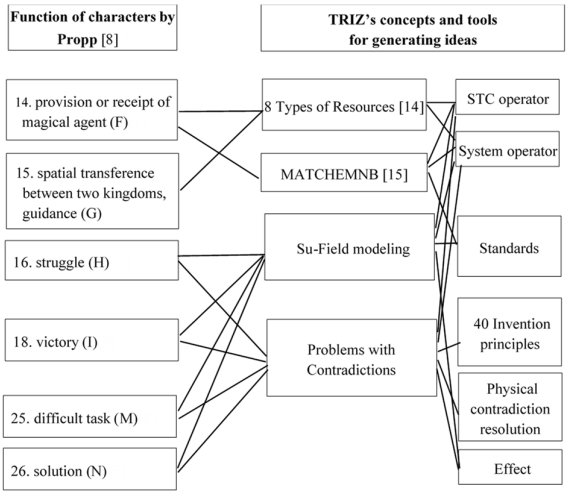

Fig. 2. An example of the connection scheme of the function elements of the fairy tale and TRIZ' concepts and tools to generate the idea of making creative variations of implementing functions.

3 CASE STUDY

3.1 Analysis of the Function of Magic in Fantasy Novel A Wizard of Earthsea with TRIZ Methodology

The American female writer Ursula K. Le Guin's famous fantasy novel A Wizard of Earthsea (1968) is a typical coming-of-age story, in which an ordinary boy goes through an adventure and grows as a great wizard in Earthsea, dominated by magic powers. From the perspective of narrative structure, it is a typical fairy tale, with Propp's struggle→ victory structure. Throughout the entire story, the three struggle-victory structures are repeated. As a result of the first struggle-victory, the protagonist recognized his darkness (shadow) hidden inside him; the second struggle → victory makes him face his fears of himself; and after the last struggle → victory, he finally can know his true self by becoming one with his other self. In the first struggle - victory structure, he learns the magic skills at the school of magic, and then goes through the struggle - victory process to realize the true meaning of the magic and become an archwizard.

In Earthsea, wizards act as engineers, doctors, and meteorologists. However, a true wizard should not only possess magic skills, but also know and protect the 'the Balance and the Pattern', because true magic is not a 'tricks of illusion', but a power to make things by transforming objects with an interaction of energy and matters. It is the power to change the balance and equilibrium of the world [6]. Learning magic in Earthsea's world is understanding this principle. Literary critics have discussed the philosophical meanings of Le Guin's magic (Taoist approach, environ-mental approach), and the problem of language as a means of expressing the nature of things has caused lively discussions of poetic imagination. In this regard, the features of Earthsea's magic make it very interesting to interpret the meaning of magic from TRIZ's point of view, especially, in terms of a systematic thinking approach.

'The high arts of a wizard' learned at the magic school can be compared with the concepts and tools of TRIZ as in Table 3.

Table 3

TRIZ's Main Steps for Problem Solving and Problem-Solving Tools [13]

Steps for learning the high arts of a wizard in *A Wizard of Earthsea* [6]	**TRIZ's concepts and tools for problem-solving**
1. Changing a thing is - to affect the nature of things surrounding the changed thing - to bring good and evil at the same time ("To light a candle is to cast a shadow…")	Systematic approach to problems such as - multi-screens (9-windows) - concept of contradictions
2. Telling a true name of a thing is - to understand the nature of a thing in order to use and control it	Function approach to systems
3. Summoning earthly forces is - to change the world as a whole	Su-Field analysis for understanding the interaction of substance and energy in the system, and their changes
4. Pattern is the wisdom of the world itself	Concept of evolving pattern of technical systems

Le Guin proposes that when an object is changed with energy, useful and harmful features appear simultaneously, and the result of that change affects the whole world; therefore the consequences of the change must be consciously con-trolled in order to maintain the Balance of the world. Her understanding of the change of an object is very similar to TRIZ's concepts of systematic analysis of systems, such as multi-screens (9-windows) based on the 'strong thinking' ex-pressed by G. Altshuller, which allows a system to be considered in terms of its relationship with all the different levels of the system as well as in terms of its change in time, whereas ordinary thinking looks at a system separately at only the system level and at a given moment in time [12].

A Wizard of Earthsea is filled with aesthetic symbols, allegories and metaphors. This work with excellent literary maturity shows the possibility of using TRIZ's concepts of the systematic thinking for elaborate composition and implementation of the magic world ('Second World' by Tolkien), which is an important factor determining the completeness of fantasy stories.

In the next case analysis, this possibility is disccused in more detail in a popular fantasy web-novel with more than 1 million subscribers on the Korean story-telling platform Kakao Page.

3.2 Function of Magic Battles in the Korean Web-novel "The Infinite Wizard"

"The Infinite Wizard", the fantasy novel that had been serialized from 2016 to early 2020 on Korea's leading storytelling platform, Kakao Page, has more than 1.3 million subscribers and has been ranked in the category of "Million sellers" by Kakao Page [16], which shows its popularity.

This novel is a typical heroic adventure story, in which a little country boy grows up to be an archwizard who saves and rebuilds the world. There are many characters in the story, and Propp's struggle → victory and difficult task → solution structures are repeated throughout the story. This, in general, can be divided into the story of the protagonist's magic school life and the story of his post-graduate adventure.

In his school days, magic functions as a driving force for growing the main characters. A factor influencing the growth of the hero is magic battles (competitions) among students. Magic, in this work, is defined as a combination of omnipotence (insight) and omniscience (scientific knowledge), as well as "a mental action that breaks common sense and explores the true nature of the phenomenon" [16]. Students each have magic skills specialized in light, electricity, heat, sound, numbers, etc. Their magic skills gradually evolve through repeated tests and magic battles in a difficult task→ solution structure. In these, the protagonist solves given tasks in innovative ways, the essence of which is to use space and time freely and infinitely.

The following is an example of analyzing the process of the hero's mastering the magic of light in this story.

Task 1. To master basic magic skills using light properties - Teleportation

Grade Test Challenge: The winner is the fastest one crossing the bridge that connects two mountain peaks at 1000 meters above sea level. The bridge is 700 meters long. The student who leaps the farthest can win. They must cross 700 meters in 10-meter increments.

Used Magic Skills: The protagonist uses teleportation with the properties of light to turn a wizard's body into light. It far surpasses the top speed occurring physically, but is much slower than light (a magic skill that turns a wizard's body into a photon using the principle of photonization, since the light is a particle).

In Magic Battle: While the participants cross the 700-meter bridge in 10-meter increments, the bridge suddenly begins to bend because of a trap, and wave-shaped obstacles continue to approach the participants. The protagonist is able to avoid these obstacles by calculating their position and speed of them, but at the final stage he faces a chaotic situation. Then, the cycle of the obstacles is shortened so that he cannot avoid the obstacles unless he moves within 1 meter (contradictory problem situation occurs. This is one of the factors influencing the fun and story immersion of this story)

The Protagonist's Victory: he increases the degree of division of time. By di-viding the intervals of teleportation to be extremely short, he turns a straight line of light is turned into a curved trajectory to avoid traps (solving contradictory problems using principle segmentation, curvature).

Task 2. To develop offensive magic skill using photon emission – photon cannon

Grade Test Challenge: The winner is the student who hits the most enemies in the virtual space in 1 minute.

Advanced Magic Skills by Developing the Photon Theory: Light does not hit the targets, because it has no mass. The protagonist uses the impact force generated by rapidly increasing the speed of the kinetic energy of light, which called photoemission. In this case, the speed of light is proportional to the speed of sequence calculation.

In Magic Battle: The protagonist's competetor is a genius at sequence calculation, calculating astronomical numbers simply with algebra and logarithms. The protagonist must calculate many sequences extremely quickly against this ability (contradictory problem situation occurs).

The Protagonist's Victory: he modularizes the numbers. Each number is grouped into units

that are all processed at once. To make it faster than logarithms, he groups numbers not evenly, but randomly. As a result, the hitting done in the form of a dot is changed to hitting all the targets entering the space at the same time, since it increases the speed (solving contra-dictory problems using the separation in relation, principle transition to another dimension).

As shown in the case analysis above, the various types of magic battles in this story are very good examples of how the various tools of TRIZ, such as inventive problem modeling, principles of contradiction resolution, MATCHEMNB, Effects, as well as tools for development of imagination, such as STC operators, can be used to create interesting fantasy stories. First, the originality of the problems and solutions, and the creativity and innovativeness of the problem-solving process can be the conditions that guarantee the entertainment and aesthetic qualities of a fantasy story. Second, instead of depending only on the artist's free imagination and his personal insight, the process of creating a fantasy story can be systematically organized and controlled to achieve the desired results effectively.

4. CONCLUSION

As storytelling platforms and contents IP businesses have developed in Korea, the demand for fantasy stories that are both elegant and entertaining has been increasing in the pop-culture industry. In this paper we proposed a methodology for creating a fantasy story using TRIZ' methodology by analyzing a world-class classic fantasy novel A Wizard of Earthsea and a Korean popular web-novel "The Infinite Wizard" using V. Propp's morphological analysis of the fairy tale.

According to Propp, there is a general pattern in the structure of various fairy tales, and the laws of their construction. The components of the fairy tale structure are divided into constant elements (the functions of the characters) and variable elements (different means for implementing the functions). The theme and diversity of the story are determined by the variable elements. Analyzing 100 Russian fairy tales, Propp pointed out that fairy tales can be divided into struggle → victory and difficult task → solution types, and that variants of the means of implementing the functions of these types greatly influence the attractiveness of a fairy tale. This Propp's approach to fairy tales is much like Altshuller's theory of inventive problem solving, which has found patterns of creative problems based on hundreds of patents and modeled them as contradictory problems. Since the magic in fairy stories serves as an important means for the hero's winning and solving difficult tasks, TRIZ's problem-solving tools can be very useful and effective for making innovative and creative variants of magic.

Magic in A Wizard of Earthsea has an ontological significance as a means of recognizing the nature of the world. True magic in Earthsea's world is the power to change a thing as well as the world, because the change always affects every-thing connected to the thing that is changed. This meaning of true magic is expressed in 9 Masters classes at the magic school, which is similar to the basic concept of TRIZ's problem-solving algorithm: systematic thinking, such as 9-windows, functional understanding of the system, and understanding of the inter-relationship between materials and energy, such as Su-field modeling.

In "The Infinite Wizard", magic is defined as a combination of insight and scientific knowledge. In this story, every wizard masters his unique magic skills in specific areas of science. The protagonist grows into an archwizard of light through various magic battles, the function of which is to develop magic skills, solving various kind of problems in the form of competition. The analysis of these magic battles shows that TRIZ's various tools for problem-solving as well as tools for creative imagination development can be used very productively, because the magic battle is characterized by a conflict in 'the Second World' governed by its own rules, which differs from 'the Primary World', and thus can be expressed to the limit easily or without any restriction.

In conclusion, we suggest that TRIZ's problem-solving algorithm can be used as a fantasy-story creation algorithm to systematize

the process of making tasks or problems appropriate to the fantasy story and creating a magical means as a suitable tool for innovative problem solving. It can also be used to innovatively improve examples of existing stories.

5. ACKNOWLEDGMENT

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Studiul unei metodologii pentru crearea unei povești fantastice folosind TRIZ

Rezumat: Odată cu dezvoltarea de platforme digitale de povestiri și de întreprinderi de conținut IP (Intellectual Property) din Coreea, cererea de povești fantastice care sunt atât plăcute din punct de vedere estetic cât și de distractive a crescut. În această re-căutare, propunem o metodologie pentru crearea poveștilor fanteziste, folosind procesul sistematic de rezolvare a problemelor TRIZ, analizând Un vrăjitor din Earhsea, unul dintre clasicii fanteziei și „The Infinite Wizard", o populară ficțiune-web coreeană, folosind analiza morfologică a basmului propusă de V. Propp. Am descoperit că magia este unul dintre factorii cheie care determină calitatea estetică și plăcerea poveștilor fanteziste, deoarece magia funcționează ca un instrument de rezolvare a problemelor în basmele de tipul „luptă → victorie" și „sarcină dificilă → soluție", formând axa structurii poveștilor de fantezie. Pe baza acestei analize, sugerăm că procesul de rezolvare a problemelor TRIZ poate fi utilizat ca un algoritm pentru sistematizarea procesului de realizare a sarcinilor creative și a mijloacelor magice inovatoare din poveștile de fantezie.

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