www.jsser.org

Journal of Social Studies Education Research

Sosyal Bilgiler Eğitimi Araştırmaları Dergisi

2017:8 (3), 215-226

English Textbooks for Russian Students: Problems and Specific Features

Marina I. Solnyshkina [1], Ol'ga D. Vishnyakova [2], Elzara V. Gafiyatova [3] & Azat I. Gabitov [4]

Abstract

The research identifies the complexity level of eight texts from Spotlight 11 used in Russian TEFL to prepare students for National Unified Exam in English and assess their reading skills. The results of the analyses conducted with the help of T.E.R.A., an automated text processor, prove that all texts fell within the range of 6 – 9 Flesch-Kincaid grade levels which correspond to the English language proficiency of the target audience. We also revealed the absence of a clear progression in difficulty across the eight texts in the continuum which may cause unpredictable test results and contribute to de-motivation of students. The results also show that the indices of narrativity, syntactic simplicity, word concreteness, referential cohesion and deep cohesion measured with T.E.R.A. do not grow but fluctuate across the continuum of the texts either. Aiming at selecting authentic texts with steadily growing complexity of each of the above mentioned parameters, we recommend to incorporate the suggested algorithm of text analysis into TEFL practice in Russia. T.E.R.A. is viewed by the authors as a tool able to provide educators with a solid foundation to select texts, develop curriculum, design assessment tasks and otherwise address academic needs of a target audience.

Keywords: *Text complexity, Syntactic simplicity, Narrativity, Readability, Texts analysis*

Introduction

The problem of fostering reading comprehension is never going to cease its significance to education as it is a key feature to any academic success. The journey from primary school to college and along one's career path is a reading journey with reading texts becoming more complex in terms of both concepts and language (Erbilgin, 2017; Pearson & Liben, 2015; Mauch & Tarman, 2016; Tarman, 2016). If textbooks offered to schoolchildren for reading comprehension do not correspond to children's cognitive and linguistic abilities, it often results in reading tasks losing their attractiveness for children, frustrations and lack of interest in studies (Gabitov & Ilyasova, 2016). Describing the current situation in TEFL in the Russian Federation, Solnyshkina and Kiselnikov (2015) argue that while selecting texts for educational purposes

[1] Prof, Kazan Federal University - Kazan, mesoln@yandex.ru
[2] Prof, Lomonosov Moscow State University - Moscow, ol-vish@mail.ru
[3] Asst. Prof, Kazan Federal University - Kazan, mesoln@yandex.ru
[4] Pst. Grad, Kazan Federal University - Kazan, gabit.azat@gmail.com

Russian textbooks writers and exam developers measure predominantly 'text readability' and use numerical scores obtained with the existing readability formulas, i.e. Flesch Reading Ease, Flesch-Kincaid Grade Level, Gunning Fog Score etc. The consequences of this oversimplified approach to the problem are inadequate texts used in English language teaching and testing in the Russian Federation.

One of the modern automated tools designed for texts complexity parameters analysis is T.E.R.A., Coh-Metrix Common Core Text Ease and Readability Assessor measuring scores of narrativity, syntactic simplicity, word concreteness, referential cohesion, deep cohesion and Flesch-Kincaid Grade level. Thus, providing a user with a comprehensive picture of text characteristics, T.E.R.A. simplifies the process of selecting texts for potential readers.

Methods

The existing readability formulas correlating text readability with school grades are based on the two main variables, i.e. mean number of letters/syllables per word and words per sentence (Readability Formulas. Free readability tools to check for Reading Levels, Reading Assessment, and Reading Grade Levels). For example, Flesch-Kincaid Grade Level (F-K GL) is calculated in a standard way using sentence length (in words) and word length (in letters) as follows: (.39 * sentence length) + (11,8 * word length) - 15,59. An increase in one of the two components of the formula results in a higher value of the text readability. Though the readability scores are widely used in pedagogical community all over the world (Duran et al., 2007), their accuracy as well as ability to correlate with children's cognitive age have been a persistent concern of many educators since the formulas were first produced (Pearson & Liben, 2015). The researchers argue that the formulas do not estimate a number of text features, such as lexical variety, complexity of grammatical structures and/or general logic of textual information. All these make them an extremely limited means of assessing text appropriateness for a target audience (Duran et al., 2007).

Another stage of the studies in the area was marked with the extension of the range of text parameters that assess their complexity (Solnyshkina & Kiselnikov, 2015). In the review article by Kiselnikov (2013) the authors conclude that the majority of modern text complexity criteria are primarily derived either based on syntactic or lexical features of texts. As a semantic category, text complexity realizes through grammar and vocabulary in a text.

T.E.R.A marked the transition to another stage of the problem development as it also measures text cohesion and coherence. At the moment, TERA, available on the public website, calculates Flesch-Kincaid Grade Level (F-K GL) and computes five characteristics of texts: syntactic simplicity, abstractness/concreteness of words, narrativity, referential cohesion, deep cohesion.

For the study presented we computed the text parameters, such as Flesch-Kincaid Grade levels, narrativity, syntactic simplicity, abstractness/concreteness of words, referential cohesion, deep cohesion of the texts from Spotlight 11, with the help of T.E.R.A and predominantly used descriptive, interpretative and contrastive methods to identify to what degree the texts correspond the cognitive and linguistic levels of the Russian students.

Results

We selected the data for the study from the students book Spotlight 11 recommended by the Ministry of Education of the Russian Federations for English language teaching in the 11th grade of public schools. The 11th grade is the final year in Russian high schools during which students are predominantly trained for final matriculation examination. To ensure the equivalence of text materials in terms of the purpose of learning, all the texts for the study were selected from Chapters A of each module of the textbook. Chapters A are designed for testing the students' skimming and scanning in the classroom. The texts were attributed numbers 1 - 8 and letter A indicating the corresponding Module and Chapter. E.g. Text 2A stands for the text used in Spotlight11 to assess students' reading skills in Module 2, Chapter A.

The genres of the texts include the following: realistic fiction, science fiction, biographies and magazine articles. All the texts selected are narrative expect for Text 8A which is descriptive. The word count varies from 385 in text 3A to 657 in text 8A. The mean number of sentences is 29. The texts were formatted in .txt files and assessed in a single-text format with the help of T.E.R.A. for narrativity, syntactic simplicity, abstractness/concreteness of words, referential cohesion, deep cohesion.

On the *first* stage of the analysis we used Flesch-Kincaid formula to calculate the corresponding reading grade level of texts 1A - 8A, i.e. what reading age children they are appropriate for. The results, as demonstrated on the graph in Img.1 below, testify to the absence of a linear progression of F - K Grade Level with texts 3A, 5A suitable for Grade 6 and texts 8A,

6A being appropriate for Grade 9 of USA schools. The easiest is Text 5A with F-K GL 6,20 and the most difficult text is Text 6A with F-K GL 9,70 (see Img. 1 below).

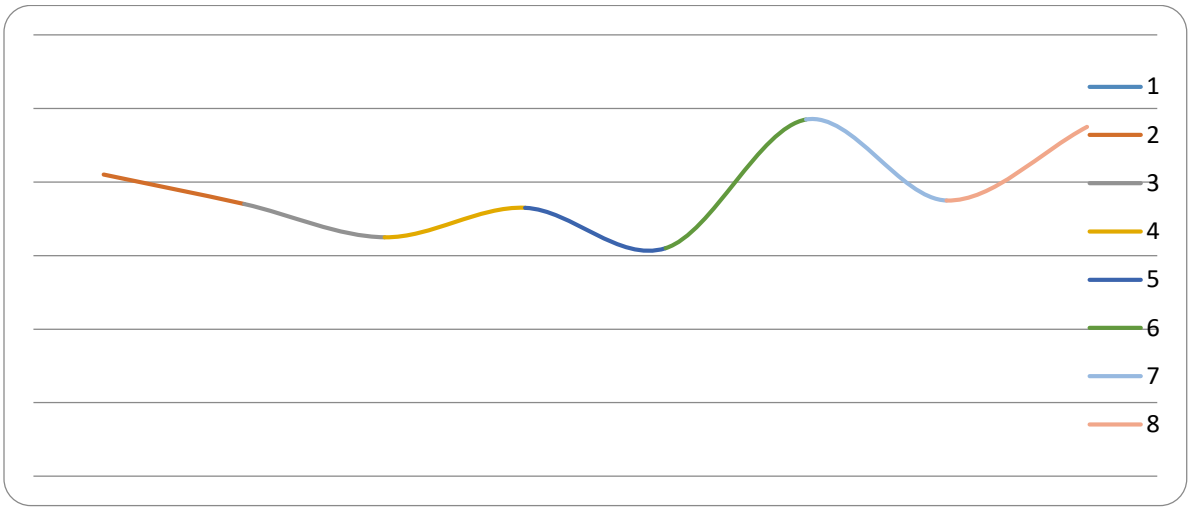

Image 1. Flesh-Kincaid Grade Levels Graph for texts 1A - 8 A.

On the *second* stage of the research we computed the 8 selected texts with the help of T.E.R.A. aiming at measuring text complexity parameters and each of its characteristics, i.e. of narrativity, syntactic simplicity, abstractness/concreteness of words, referential cohesion and deep cohesion.

Avoiding restrictive categorizing of *narrativity*, T.E.R.A developers adapt a comparative view on the notion and define narrativity in relative terms: a text may have higher or lower degree of narrativity in contrast with all the texts in T.E.R.A. library. In general terms narrativity is defined as the quality or condition of presenting a narrative (Oxford Living Dictionaries). Accordingly, texts with a low value of narrative parameters contain a high proportion of unique nouns and a variety of temporal forms as is the case in Text 8A: "*Otherwise known as The Lost City of the Incas', Machu Picchu is an ancient Incan city located almost 2,500 metres above sea level in the Andes Mountains in Peru. Machu Picchu is invisible from below".* An ideally simple text will be a set of similar type sentences, whereas a complex one will not have one similar combination of pairs of sentences in its entire body. "The identity of sentences in the text will, however, change the deep connectivity of the text" (Crossley & McNamara, 2016).

All the texts of Chapter A, except for Text 8A, are narrative and the corresponding parameter scores measured by T.E.R.A. vary from minimum of 69% in Text 4 to maximum of 92% in Text 3A. Text 3A demonstrates a high density of verbs: *"I couldn't even remember buying a ticket! Anyway, I contacted the people the letter was from, who asked me to send them a 'fee' to process my winnings".*

The Narrativity of Text 8A, as shown in Img. 2, is only 30%. Thus, T.E.R.A. discriminated the text of another genre by calculating its Narrativity.

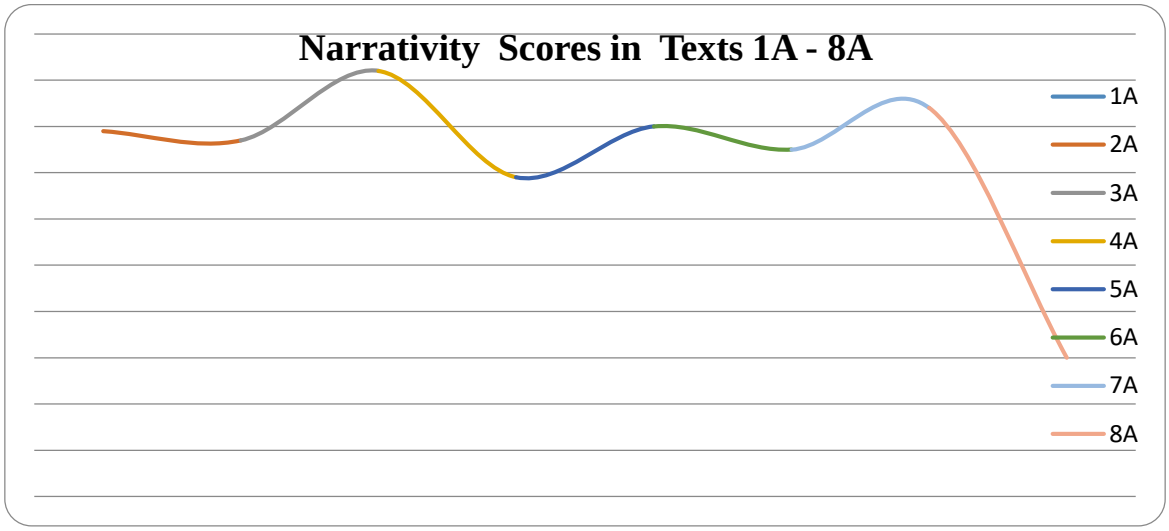

Image 2. Narrativity Graph for texts 1A - 8 A.

Though indices of narrativity of Texts 1A - 7A do not progress form low to high, they demonstrate a certain degree of consistency and do not fall below 69%. Text 8A was excluded from the further analysis based on the assumption that different types of texts demonstrate differences in the frequency of core vocabulary words (Lee, 2001), in the way that cohesion relations are expressed (McCarthy, Graesser & McNamara, 2006), in the rate at which rare words are repeated (Heibert, 2009), etc.

Indices of syntactic simplicity, word concreteness, referential cohesion, deep cohesion for texts 1A - 7A are presented on the corresponding graphs in Img.3 below. The observed fluctuations are as follows: for Syntactic Simplicity – 31%, Word Concreteness – 64%, Referential Cohesion – 31%, with the minimum variation in Deep Cohesion – 25%. The Syntactic Simplicity graph demonstrates that the syntax indices of the texts studied are medium

and vary from 34% in Text 1A to 65 % in texts 2A and 4A. The lowest indices are those of *Referential Cohesion*, with the lowest of 9 % in Text 7A and the highest being 40% in text 3A. Texts also showed a decrease in *Referential Cohesion* from around 40 % in Texts 1 A and 2A to 9% in Text 7A. But there is a remarkable growth in the numbers observed in *Word Concreteness*: 14 % in Text 6A and 70% in Text 3A. Cf.: "The searches are based on the hypothesis that aliens may be intentionally sending communication signals out across the universe, or that signals from their worlds could be escaping into space – just as our own radio, television and military broadcast signals escape into the cosmos" (14 %, Text 6A); "Burglars recently broke into our house while we were sleeping upstairs! My sister and I heard a noise, so we woke up our dad, who called the police." (70%, Text 3A). *Deep Cohesion* of all the texts studied is relatively high and remains between 74% in Text 3A and 99% in Text 2A.

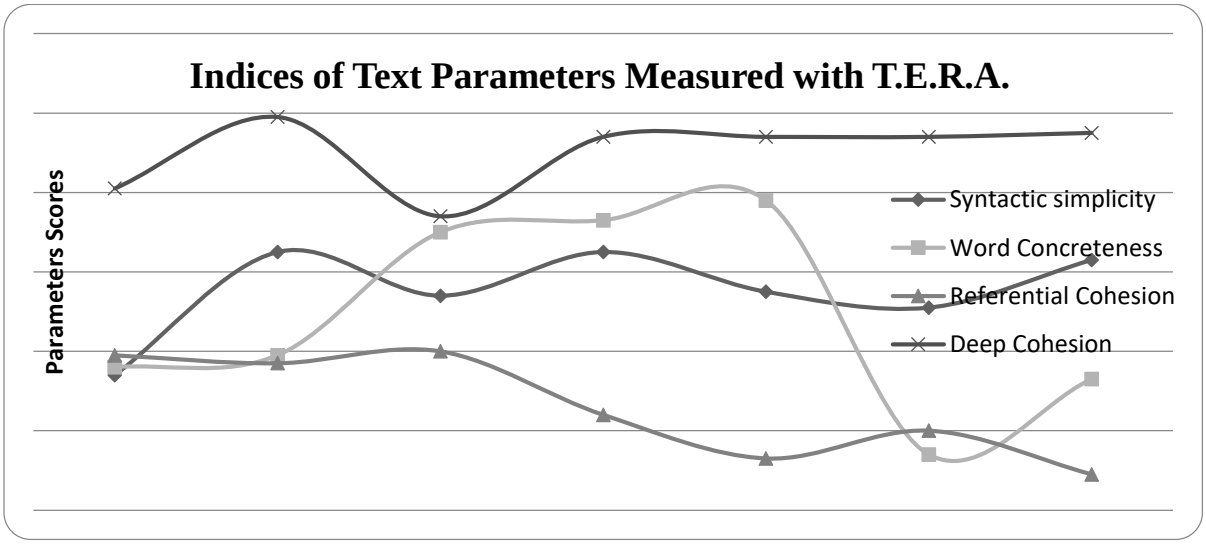

Image 3. Graphs of Complexity Parameters for Texts 1A - 7A.

Discussion

Syntactic simplicity is a parameter dependent on three measured variables, i.e. mean of clauses throughout the text, mean of words in the sentence, and mean of words in front of the main verb (McNamara & Graesser, 2012). Table 1 below shows the complexity parameters of the texts with minimum (1A) and maximum (2A) scores of *Syntactic simplicity*. As we see their F-K G Levels are only 1.3 grade different. The excepts from Text 1A and Text 2A below are self-explanatory. Cf. Text 1: *I am an only child and I live with my parents and my grandma, or*

'babushka' as we say here in Russia. My grandpa passed away last year so Babushka left her house in the country to come and live with us here in the city. Text 2A: *In a nutshell, "stress" is the way our bodies and minds react to life's changes. In stressful situations, the nervous system causes muscles to tense, breathing to become shallow and adrenaline to be released into your bloodstream as your body gets ready to beat challenges with focus and strength*.

Table 1

Indices for Two Representative Texts 1A and 7A

Text	Narrativity	Syntactic simplicity	Word Concreteness	Referential Cohesion	Deep Cohesion	Flesh -Kincaid Grade Level
1	79%	34%	36%	39%	81%	8,20
2	77%	65%	39%	37%	99%	7,40

Abstractness/ Concreteness of words as it comes from the name, shows the proportion of concrete words to abstract ones. The developers of T.E.R.A. define concrete words as "words that refer to things you can see, hear, taste, touch, feel, or smell. Abstract words cannot easily be seen, heard, touched, felt or smelled" (McNamara & Graesser, 2012). With a high content of specific vocabulary or professional jargon, the text becomes more difficult for the reader to understand. The texts studied contain a number of words the concreteness of which is obvious, i.e. *sand, beaches, friends, house, dad* (Texts 3A, 6A). The abstract words registered in the corpus of the texts Spotlight 11 are as follows: *dream, obstacles, failure, goal, ambitions* (Text 7A). But category of Abstractness/ Concreteness is a non clear-cut phenomenon but a continuum, and there are words in the vocabulary of every language which depending on the context may be viewed either as concrete or abstract: '**a field** of tulips' vs '**a field** of knowledge'. The potential difficulty in measuring the parameter of *Abstractness/ Concreteness* in a separate text lies in the requirement to identify its value for every word in the text, which implies the necessity of a source referring to which a researcher would get the value of each word in a text. T.E.R.A. developers use MRC Psycholinguistic database for concreteness ratings, the word lists of which "are incomplete due to the limited size of the word samples" (McNamara & Graesser, 2012). The texts with extreme indices of Word Concretenessin the continuum are Texts 5A and

6A with F-K GL 6.20 and 9.70, respectively (See Table 2). The majority of the indices of the texts are distinctively different while F-K G Levels are about the same.

Table 2

Indices for Two Representative Texts 5A and 6A

Text	Narrativity	Syntactic simplicity	Word Concreteness	Referential Cohesion	Deep Cohesion	Flesh -Kincaid Grade Level
5	80%	55%	78%	13%	94%	6,20
6	75%	51%	14%	20%	94%	9,70

Referential cohesion is a measure of the overlap between words in the text, formed with the help of similar words and ideas transmitted by them (McCarthy et al., 2006). To maintain a high level of the parameter, it is necessary to provide proposals with one or more types of specified means (Rowe, Ozuru & McNamara, 2006). Contrasting indices of Referential cohesion in Texts 1A - 7A, we revealed a range of scores with the minimum of 9% in Text 7 A and the maximum of 40% in Text 3 A. Consider a sample from Text 3A with a high value of this parameter: Getting married and having a family is a top priority for me. My marriage will probably be arranged by my father, which is quite common here. (Spotlight 11, Text 1A). We can see a number of repetitions of derivatives related to the same root: married – marriage, me – my as well as hyperonym – hyponym relations: a family – my father. The word *which* refers to the idea of 'the marriage being arranged by the father of the writer' thus connecting two parts of the sentence, that the reader interprets as a whole. Text 7A demonstrating the lowest value of Referential cohesion in the corpus, i.e. 9%, runs as follows:

"Believe in yourself (subtitle of the text).

Without a doubt, this is the first step on the road to achieving your dreams! And this means not listening to anyone who tells you, 'You can't.' Einstein, Beethoven and Edison, all knew about this". It is obvious that the pronoun *this* in the first sentence of the text refers to the idea expressed in the subtitle of the text, i.e. *believe in yourself*, to elicit this information is much more cognitively difficult for a non-native student of English than in a sentence with stronger connections between parts of a text and a sentence.

Table 3

Indices for Two Representative Texts 6A and 8A

Text	Narrativity	Syntactic simplicity	Word Concreteness	Referential Cohesion	Deep Cohesion	Flesh -Kincaid Grade Level
3	92%	54%	70%	40%	74%	6,50
7	84%	63%	33%	9%	95%	7,50

Texts 6A and 8A, i.e. the texts with the highest and lowest values of referential cohesion, have a high value of narrativity and deep cohesion but a relatively low value of *Referential Cohesion. Referential Cohesion* scores of 9% certifies to poor logical connections between the ideas in the adjacent sentences of the texts, i.e. coherence.

Deep Cohesion determines how well the events, ideas, and information of the entire text are related at a level that is understandable by a human (Readability Formulas. Free readability tools to check for Reading Levels, Reading Assessment, and Reading Grade Levels). As it can be observed from Table 4, Deep Cohesion has very little correlation with F-K GL.

Table 4

Indices Two Representative Texts 2A and 8A

Text	Narrativity	Syntactic simplicity	Word Concreteness	Referential Cohesion	Deep Cohesion	Flesh -Kincaid Grade Level
2	77%	65%	39%	37%	99%	7,40
8	30%	36%	80%	22%	42%	9,50

Thus, the research demonstrated a wide range of syntactic simplicity (over 30%) and word concreteness scores (60%) in the narrative texts studied. *Narrativity* and *Deep Cohesion* scores do not fall below 69%, while referential cohesion does not rise above 40%. As we know "Automatic event extraction is an important task in knowledge acquisition step" (Solovyev & Ivanov, 2016).

Conclusion

The comparative study of eight texts used in Spotlight 11 to assess students' reading skills demonstrated that Flesch-Kincaid Grade Levels of the texts fluctuate from 6 to 9 presenting a non-linear progression. This fact revealing lack of a comprehensive approach applied by the authors of Spotlight11to selecting texts for academic purposes may not only de-

motivate students but also invalidate the tests in which the texts are used. We advocate sequencing academic texts from easy to difficult since it is more likely to generate positive responses from students and have a positive impact on reading tests results.

Findings on *Narrativity, Syntactic Simplicity, Word Concreteness, Referential* and *Deep Cohesion* variables of Coh-Metrix gained by the authors are similar to those of Flesch-Kincaid Grade level – none of the indices demonstrated a progression of easier to harder across the continuum of the eight studied texts. As consistent progression of each complexity parameter in authentic texts selected for academic purposes, though ideal but inaccessible, we suggest using T.E.R.A. as an instrument to help educators to assess text dimensions and provide students with enough training to be ready for separate complexity parameters spikes.

Acknowledgements

The authors would like to thank administration of the Program of Competitive Growth of Kazan Federal University for their support and assistance with the preparation and publication of the article as well as their appreciation of the benefits to be gained from the research conducted.

References

Crossley, S.A. & McNamara, D.S. (2016). *Adaptive Educational Technologies for Literacy Instruction*. York, NY: Routledge.

Duran, N.D., Bellissens, C., Taylor, R.S. & McNamara, D.S. (2007). Quantifying text difficulty with automated parameters of cohesion and semantics. In: *Proceedings of the 29th annual meeting of the cognitive science society* (233-238). Mahwah, NJ: Eribaum.

Erbilgin, E. (2017). A comparison of the mathematical processes embedded in the content standards of Turkey and Singapore. *Research in Social Sciences and Technology,* 2(1): 53-74.

Gabitov, A.I. & Ilyasova, L.G. (2016). Use of automated instruments of text analysis to provide proper difficulty level of English language educational materials. *Problems of Modern Pedagogical Education: Pedagogy and Psychology*, 53(3): 101-108.

Heibert, E.H. (2009). *Interpreting Lexiles in online contexts and with informational texts*. Seattle, WA: Apex Learning.

Kiselnikov, A.S. (2013). Formulas of readability as a text analysis tool. In: *Language. Society. Consciousness: Collection of articles* (247-253). Kazan: Fatherland.

Lee, D.Y.W. (2001). Defining core vocabulary and tracking its distribution across spoken and written genres. *Journal of English Linguistics*, 29: 250-278.

Mauch, J. & Tarman, B. (2016). A Historical Approach to Social Studies Laboratory Method. *Research in Social Sciences and Technology*, 1(2): 55-66.

McNamara, D.S., & Graesser, A.C. (2012). Coh-Metrix: An automated tool for theoretical and applied natural language processing. In: *Applied natural language processing and content analysis: Identification, investigation, and resolution* (188-205). Hershey, PA: IGI Global.

McCarthy, P., Graesser, A.C. & McNamara, D.S. (2006). *Distinguishing genre using Coh-Metrix indices of cohesion*. Poster presented at the annual meetings of the Society for Text and Discourse, Minneapolis, MN.

McCarthy, Ph.M., Lightman, E.J., Dufty, D.F. & McNamara, D.S. (2006). Using Coh-Metrix to assess distributions of cohesion and difficulty: An investigation of the structure of high-school textbooks. In: *Proceedings of the 28th Annual Conference of the Cognitive Science Society* (190-195). Mahwah: Eribaum.

Narrativity (n.d.). In: *Oxford Living Dictionaries*. Retrieved from

https://en.oxforddictionaries.com/definition/narrativity.

Pearson, D.P. & Liben, D. (2015). *The Progression of Reading Comprehension*. Retrieved from https://docs.gatesfoundation.org/documents/literacyconveningprogressionofcomprehension.pdf.

Readability Formulas. Free readability tools to check for Reading Levels, Reading Assessment, and Reading Grade Levels. Retrieved from http://www.readabilityformulas.com/.

Rowe, M., Ozuru, Y. & McNamara, D.S. (2006). An analysis of a standardized reading ability test: what do questions actually measure? In: *Proceedings of the Seventh International Conference of the Learning Sciences* (627-633). Mahwah: Erlbaum.

Solnyshkina, M.I. & Kiselnikov, A.S. (2015). Text complexity: study phases in Russian linguistics. *Tomsk State University Journal of Philology*, 6(38): 86-99.

Solovyev, V. & Ivanov, V. (2016). Knowledge-Driven Event Extraction in Russian: Corpus-Based Linguisti. *Computational Intelligence and Neuroscience*, Article ID 4183760, dx.doi.org/10.1155/2016/4183760.

Tarman, B. (2016). Innovation and Education. *Research in Social Sciences and Technology*, *1*(1): 77-97.