EMPOWERING EDUCATORS TO TEACH ONLINE READING, LEARNING, AND COMPREHENSION SKILLS ON THE EXAMPLE OF ECOLOGICAL PROBLEMS

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Abstract

Reading and learning are changing rapidly in today's world, and educational systems sometimes fail to keep pace. To define the needs related to reading in the modern world, the Stavanger Declaration was written, stating that students should be taught online reading and learning strategies. Educators must also adapt to this. As part of the Learning, Teaching, and Training (LTT) activities, participants (21 individuals from different levels of education) were introduced to the Internet reciprocal teaching (IRT) method. The basis of this research was to find out whether we can empower educators to teach online reading, learning, and comprehension skills in a short training session using the ubiquitous topic of ecological problems as an example. We were also interested in whether a short program that empowers educators to use IRT in their classroom can influence teachers to develop students' digital literacy in their pedagogical work. The results show that the ecological issue, with its timeliness and universal presence in our lives, is an appropriate topic for educators to teach digital literacy. The participants were successful in solving the set tasks, and all of them answered that they would use the IRT method in their future pedagogical work.
Keywords: *digital literacy, ecological problems, internet reciprocal teaching method, problem-solving, teacher training*

Introduction

Teaching digital literacy is about how to better understand what we read online. The Stavanger Declaration (E-Read, 2019) indicates that teachers and other educators should teach students strategies that can help them read and learn online. However, teachers often do not have sufficient knowledge about how to teach students to read and learn online because they have not acquired this knowledge as part of their formal education. One of the methods for teaching students to read is the Internet Reciprocal Teaching (IRT) strategy developed by

Leu et al. (2015), which has been shown to be particularly effective in helping adolescents read online. The IRT strategy is appropriate for developing functional literacy in digital learning environments of older students (older than 9 years), while younger students were less successful or needed some adaptations (Kordigel Aberšek & Kerneža, 2022) because their computer skills are not yet sufficiently developed (Kerneža & Kordigel Aberšek, 2022).

The IRT strategy is based on the Reciprocal teaching method, in which the teacher explains the steps of the strategy and then models all the steps using "thinking aloud" method while the students observe them. Later, students are divided into small groups, with individual students in each group taking on the role of teacher (moderator). Students teach each other, and the teacher intervenes only when there is a misunderstanding between students (Palinscar & Brown, 1984). What Reciprocal Teaching and Internet Reciprocal Teaching have in the gradual transfer of responsibility from the teacher to the students and the collaboration and discussion between all participants (Castek et. al., 2015). The IRT method and the Online Reading Comprehension Assessments, featured in ORCA Project (Leu et al., 2008), under which Leu and his researchers developed a model that empowers teachers to prepare students for communication in the 21st century in a way that students develop online research and comprehension skills, is a response to emerging new literacies (Leu et al., 2013; Leu et al., 2015) which require different ways of reading and learning, and different approaches that teachers use.

The IRT method is based on the transition from less complex to more complex reading tasks, i.e., from searching for information between two web pages, to reading within multiple web pages, to reading within a search engine, and later reading the entire Web, and finally to reading and writing online messages (Castek et al., 2015). It includes several key elements such as the use of online informational texts, the reading of unique texts students find online, the instruction in a classroom made up for students with different experiences with digital tools and online texts, the integration of both teacher and student modeling of online comprehension strategies, a focus on questioning, locating, critically evaluating synthesizing, and communicating strategies as important elements of online reading, and collaboration and discussion among all participants (Castek, 2017, p. 210). Students fly over the text online and identify key information and essential details based on the task and their classroom skills. They ask questions about the text based on what they have read, and then work as a group to interpret parts of the text, followed by a summary that includes the main ideas of the text. The text is then evaluated by relating what students have read online to their prior knowledge and experience (Castek et al., 2015).

Research Problem

The Stavanger Declaration highlights the issue of the future of reading and points out that it will be necessary to find ways to enable in-depth reading even in a screen environment (E-Read, 2019). Ecological topics also require long and in-depth reading due to their complexity, which can be supported by the IRT method. The popularity of the topic has a significant impact on the amount of information available on the Internet, where much secondary and tertiary data can be found. These often distort the primary data, as they are used by various companies for commercial purposes. Also, the interpretation of the data is often inadequate, insufficient, and amateurish; much of the data is outdated, which means

that long and deep reading skills are required for successful reading and learning about ecological issues. Even adult, more experienced readers often cannot navigate the mass of information, and this is especially true for younger students (Legvart et al., 2021; Legvart et al., 2022).

The theme of ecological problems was chosen because of its topicality and its wide presence in our lives. From the perspective of construction-level theory, environmental problems are abstract and distant, but we are paying more and more attention to them so that they become actual and concrete (Trope & Liberman, 2010). The search for information about ecological issues is not only an end in itself, but it gives the information seeker a broader meaning and complement to the knowledge that is (supposedly) personally important to him, as it also affects his existence and quality of life.

Research Focus

The main aim of the research program was to obtain data on whether the ubiquitous topic of the environment is appropriate for enabling educators to teach online reading, learning, and comprehension skills (elements of digital literacy), and whether we can influence teachers to use the IRT method in their pedagogical work.

Research Methodology

General Background

In May 2022, participants in the Learning, Teaching, and Training (LTT) activities were introduced to the IRT method for the first time. The opinion of the participants, most of whom were teachers at different levels of education, was studied in terms of the usefulness of the presented method in the pedagogical process. A topical issue was chosen for the study, which is omnipresent in our lives due to its topicality: ecological problems. The IRT method was presented in the context of problem-based learning using ecological problems as an example. Participants in the LTT activities addressed major current environmental problems such as pollution, global warming, overpopulation, waste disposal, ocean acidification, biodiversity loss, deforestation, ozone layer depletion, acid rain, and public health issues.

Sample

The convenience sample includes 21 participants (100.0 %) who attended the LTT activities, most of whom are educators (90.5 %) teaching at different levels of education. 9.5 % of the participants are representatives of an association for supporting and developing activities and promoting active participation of citizens at different levels and in different areas of social life. Most of the participants were from Turkey (81.0 %), where the training was conducted, and the remaining participants were from Slovakia (9.5 %) and Slovenia (9.5 %). The participants of the training did not know the IRT method before the training (100.0 %). The study was conducted in accordance with the research standards and ethics of the Institute of Contemporary Technology, Faculty of Natural Science and Mathematics, University of Maribor (FNM_ICT) and approved by the Ethical Commission for studies involving humans (1_2022).

Instruments and Procedures

Prior to the presentation of the IRT method, and before reading and searching on the Internet, a brainstorming session was conducted on the Mentimeter.com website in which participants answered two questions, writing down up to three keywords for each question:
  − What do you think are the environmental problems?
  − Who/what pollutes the environment the most?

These initial questions were used to refresh the participants' foreign language vocabulary (the activities were conducted in English, which is a foreign language for all of them) and also to check whether the educators, who come from different levels of education, have sufficient knowledge to carry out the planned activities and explore the questions asked. In this way, the participants' prior knowledge was also activated as part of reading and learning strategies.

Figure 1

Perception of Environmental Problems by Participants of the LTT Meeting
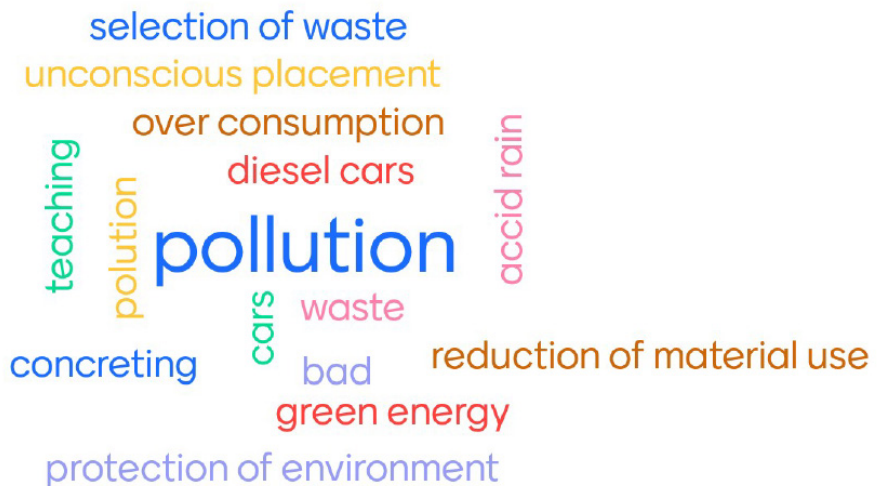
Source: Research on Mentimeter.com

The results show (Figure 1) that the participants of the LTT meeting have sufficient vocabulary and knowledge to explore the field of ecological problems and to continue the established activities. The participants believe that the biggest environmental problem is pollution, followed by reasons such as acid rain, green energy, cars, concreting, diesel cars, overconsumption, reduction of material use, selection of waste, unconscious placement, and waste.

In order to make a final decision about the planned activities, participants were also asked who or what they thought polluted the environment the most (Figure 2).

Figure 2

Perceived Major Contributors to Environmental Pollution by LTT Participants

Source: Research on Mentimeter.com

LTT participants believe that humans pollute the environment the most, which is indirectly confirmed by the other responses. To a greater extent, participants mentioned industry, farming, and airplanes, followed by sports cars, plastics, fossil fuels, unconsciousness, home (households), and transport. Responses to the second question also indicate a reasonable level of vocabulary consistent with online research on ecological issues.

A presentation of the IRT method followed, where participants learned about the theoretical starting points, which were further supported by practical examples and a demonstration for which the terms ecological footprint and green energy were chosen.

Participants were then asked two questions, the answers to which they had to find on the Internet following the steps and principles of the IRT method. They explored how big their country's ecological footprint was and tried to find out what contributed the most to it. The environmental topics were then linked to problem-based online learning. Later, participants examined how much green energy their countries produced and how successful their countries were in this area.

Participants searched for answers to the following questions using the IRT method:

− How big is your country's environmental footprint and what contributes the most to it?

− How much green energy does your country produce? How successful is your country?

After the training, participants were asked in the form of an anonymous survey whether they would include the presented IRT method in their classes in the future.

The validity, reliability, and objectivity of the questions and tasks asked were monitored and evaluated throughout the study.

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Data Analysis

The study was based on a descriptive and causal non-experimental method of educational research. The data obtained were analyzed in different ways. The data obtained through brainstorming is interpreted qualitatively. The collected data that the participants had researched online were reviewed by the education provider and an expert in the field of environmental issues. The analysis and interpretation of the data obtained are based on the relevance of the information obtained online using the IRT method. The data are compared in terms of frequency distribution. The final question, whether the participants of the training will use the IRT method in their teaching in the future, was analyzed using the frequency distribution.

Research Results

Responses and the proportion of relevant responses to the question of how large the ecological footprint of their country is are shown in Table 1.

Table 1
Overview of National Ecological Footprint and Key Contributors by Country

Country	Participants (f)	The share of relevant answers (f %)	Ecological footprint per inhabitant in 2020 [gha]	Biggest contributors
Slovakia	2	100.0	4.7	Industrial processes and product use, transport
Slovenia	2	100.0	5.4	Buildings, transport
Turkey	17	100.0	3.3	Energy consumption, industrial enterprises

On the Internet, we can find many answers to the question posed. Some are outdated, others explain other aspects of the ecological footprint. Using the IRT method, the training participants found a suitable answer to the question of how big the national ecological footprint is, and they also found suitable answers to the question of what contributes most to the size of the ecological footprint of their country (Table 1).

Training participants also researched how much green energy their country produced and how successful their country was in the variety of websites and information on the Internet (Table 2).

Table 2

Distribution of Responses Regarding the Ecological Footprint Size and Main Contributors by Country

Country	Participants (f)	The share of relevant answers (f %)	Renewable source of energy [%]	Successfulness
Slovakia	2	100.0	26	Somewhat successful
Slovenia	2	100.0	33	Somewhat successful
Turkey	17	100.0	43	Successful

The results (Table 2) show that the IRT method was successful in finding answers, because all of the participants' answers were appropriate, and they also managed to interpret the results from the perspective of their country's performance in producing green energy.

After the practical test of the IRT method, the training participants also answered the question of whether they would use the presented method in their educational work (Table 3).

Table 3

Intentions to Incorporate the IRT Method in Future Educational Work

Participants	Yes		No	
	f	f%	f	f%
Inclusion of the IRT method in future teaching	21	100.0	0	0.0

The participants of the training agreed that they will use the IRT method in their pedagogical work in the future.

Discussion

It has been shown that the IRT method can be successfully applied in the field of reading and learning about environmental problems and green energy. The focus of the research was to explore the IRT method for the purpose of researching the topic of ecological problems in order to enable educators to use the IRT method in their educational work. The research was aimed at educators, since they are the addressees of the method. The results show that the IRT method supports reading, learning, and comprehension in the information overload that individuals find themselves in when searching for data about ecological footprint and green energy. Participants in the LTT activities were successful in finding data for their country, and after the training, all indicated that they would use the method in their work.

Leu et al. (2015) developed the IRT method with the goal of helping adolescents read online in a way that allows them to select genuine and authentic information from the multitude of information offered by the World Wide Web. In the current study, the topic of ecological problems was researched by adults, and it was found that sometimes even adults do not have sufficient skills to select relevant information from the Internet. The majority of

participants have not (yet) thought about the search methods and procedures they use when searching for information and reading on the Internet. The method seems to be necessary and effective not only for young readers, but also gives adults a tool to select the data they find on the Internet. Collaboration and discussion among participants proved to be particularly important elements of the study, highlighted by Castek et al. (2015), which was even more detailed and in-depth, as participants showed great interest in the topic discussed (not only related to the topic of ecological footprint and green energy), with the personal significance of the chosen research topic also proving to be particularly important and a key element of motivation for information search. The goal, of course, was not to teach adults the basic skills of online information search, but to familiarize them with a method they could use in their classes. It turned out that even if the adults saw it differently, they had not yet mastered all the skills – not only more complex skills, but also basic skills and, of course, more complex reading tasks. By using the IRT method, they themselves recognized their knowledge gaps, which they also accepted after the theoretical presentation and practical application.

Conclusions

The main aim of the study was to determine if we can empower educators to teach online reading, learning, and comprehension skills using ecological problems as examples, which the results of the study confirm. However, it is necessary to highlight two other findings. The personal relevance of the topic discussed has been shown to be important, especially for the purpose of the discussion, and the research also shows that even experienced adults do not have some basic and complex knowledge and skills that they should have for successful reading and learning online. This is especially important when we talk about educators who are supposed to teach and train students in the use of knowledge and skills that they themselves do not (yet) possess, which points to the need to train educators in the area of these skills.

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Declaration of Interest

The authors declare no competing interest.

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