Embedding sustainability into English environment: a holistic approach

Elena Rudenko

Corresponding author: RudenkoElena1988@yandex.ru

Abstract. The paper explores ways of increasing environmental awareness of students through incorporation of sustainability-related issues into a general English language course. We view language as a living system promoting life-sustaining relationships of humans with each other and with their natural environments. We hold the view that learning English as a foreign language holds powerful potential to promote the values of sustainable development, which should not be overlooked by English language teaching staff. The results of the study show that sustainability concerns are treated as discrete problems in textbooks and are often narrowed down to environmental issues, while social justice issues are left out of consideration. The percentage of units covering sustainability-related topics is considered unsatisfactory. According to the sentiment analysis conducted for textual material, the neutral sentiment is dominant, which can reduce the desired educational effect of sustainability-related texts. The author arrives at the conclusion that reconceptualization of the course framework is needed and presents practical suggestions aimed at developing a more holistic worldview and raising ecological awareness without fundamentally restructuring the whole textbook.

1 Introduction

Our environmental problems are a subject of great concern among scientists who are warning us that human activity can lead to "profound changes in essential life-sustaining functions of planet Earth [1]". The way out of the crisis must be sought not only through decisive socio-economic and political measures, but also through a permutation in human relationship to the natural world. A conscious change of direction aimed at intensifying the ecological component is the indispensable requisite for a quality existence of humanity. That is why the formation of ecology culture based on universal values and dissemination of eco-cultural knowledge constitute an immanent condition of all levels of education.

The 2030 Agenda for sustainable development with a set of 17 Sustainable Development Goals (SDGs) adopted by UN General Assembly declares that sustainable development is a win-win solution for people, environment and economy. This, in turn, has fostered educational community's transition to sustainability. A great deal of emphasis has been placed upon the exploration, implementation, and evaluation of curriculum designs and pedagogical practices to embed the principles of education for sustainable development.
(ESD) into different education contexts in recent years [2-8]. However, little research exists on examining of how English (as a foreign language) can contribute to fostering sustainability competencies within the ambit of higher education. The few existing studies focus on the following perspectives: introducing mobile learning into education to raise students’ interest in relevant environmental issues [9], promoting sustainability literacy among engineering undergraduates [10], studying future teachers’ rate of awareness of the Sustainable Development Goals (SDGs) [11].

The purpose of the paper is to explore practical ways of incorporating sustainability-related aspects into EFL classes within Russian tertiary education system. In Russia, English language course is a compulsory university discipline, with students acquiring general English as well as English for specific purposes. According to Federal State Educational Standards for Higher Education in Russia, English language course taught in non-linguistic institutions pursues along with practical learning goals (mastering communication skills) educational ones, which involves extending horizons of students, raising their general cultural level, improving their culture of speech. Thus, learning English as a foreign language holds powerful potential to promote the principles and values of sustainable development.

This study focuses on ways of increasing environmental awareness of students through incorporation of SDGs into a general English language course in “T–University”. “T–University” is a strategic project of Don State Technical University specifically aimed at training innovative engineers of the new generation; it is based on the principles of individual education trajectories and action-oriented approach integrated with problem-based learning. The undergraduate education space is implemented through a model “1+1+2”, which includes several subspaces meaningfully connected to each other: “University Minimum”, “Electives”, “Fields of Science and Technology”, “Majors”. Within their first year of study students have to take a number of core and elective courses, English being an obligatory discipline. Engineers have a pivotal role in designing appropriate, resilient solutions and providing sustainable energy, which should not be overlooked by English language teaching staff.

To achieve its broad objective mentioned above, the study pursues the following specific objectives:
- to analyze English textbooks content with regard to proportion of SDGs-related issues;
- to assess positive, negative or neutral emotional content expressed in texts covering SDGs-related issues via sentiment analysis algorithm;
- to suggest practical steps to be taken to embed SDGs-related issues throughout the entire general English course.

2 Materials and methods

The material of this study has been obtained from intermediate general English textbooks: Speak Out (Pearson), Cutting Edge (Pearson), Outcomes (National Geographic Learning), Headway (Oxford University Press), English File (Oxford University Press). Following the course requirements established by “T-university”, an English textbook “Speak Out” is used in a general English course. Other textbooks were included in the analysis to identify which option shows the highest proportion of SDGs-related topics.

This study has been conducted in the following steps:
- step I involved analyzing and comparing textbooks content to identify proportions of coverage of SDGs-related topics;
- step II involved quantifying the valence of sentiments (positive, negative, neutral, or mixed) expressed in texts covering SDGs-related issues using Stanford NLP. We assume that emotionally-charged texts can contribute toward much deeper assimilation of the material, and encouraging a deeper emotional response can also contribute to the ultimate goal of eco-
centered education, which is not only to increase awareness of environmental concerns but to take responsible actions towards sustainability. Studies suggest that factual texts that convey information fail to achieve the desired educational effect: “…learning activities which are dominated by pure informative style cannot help learners to construct skills that would help them adopt a positive behavior towards the environment [12]”.

- offering methodological recommendations on how to consistently incorporate SDGs-related issues into study material.

3 Results

To evaluate the degree to which general English textbooks cover SDGs-related topics we’ve excluded from analysis a set of extra materials (vocabulary/grammar/sound/communication banks etc.) as they are aimed at increasing students’ word power, grammar competence and are mostly presented as a string of single sentences, not related to each other in any unifying context conveying the idea of sustainable living; audio and video scripts were included in the analysis.

The textbooks under evaluation and proportions of coverage of SDGs-related topics within them is given below (Table 1).

Table 1. Proportions of coverage of SDGs-related topics in general English textbooks.

<table>
<thead>
<tr>
<th>Textbook title</th>
<th>Year/Edition</th>
<th>No. of pages</th>
<th>SDGs-related topics</th>
<th>No. of pages</th>
</tr>
</thead>
</table>
| Speak out          | 2015/2nd edition | 137          | • Unit 3 Future (Health: Big Data, 3D printers; Global problems: vertical farming; A sustainable world by 2040)  
                        • Unit 5 Solutions (Low tech solutions)  
                        • Unit 8 Communities (Remote communities: environmentally friendly living)  
                        • Unit 10 The World (Environment: ethical living, the plastic problem, the Great Melt) | 13 (9%)       |
| Cutting Edge       | 2013/3rd edition | 130          | -                                                                                     | --           |
| Outcomes           | 2015/2nd edition | 184          | • Unit 13 Journeys (Social inclusion: refugee-hosting)  
                        • Unit 14 Technology (Environment: Air pollution tracking) | 3 (1.6%)      |
| Headway            | 2019/5th edition | 140          | • Unit 6 Easier said than done  
                        • Unit 9 Caring and sharing  
                        • Unit 12 Living the dream (Eradicating poverty: charity workers) | 7 (5%)        |
| English File       | 2019/4th edition | 131          | • Unit 2a Spending money (Sustainable consumption)  
                        • Unit 2b Changing lives (Quality education) | 6 (4.5%)      |
The textbooks under analysis were designed to align to a particular theoretical framework of language proficiency (CEFR, GSE) and cover a wide range of contemporary topics, however, SDGs-related topics are present sporadically and, in some cases, (e.g. Cutting Edge) we observe that the number of texts devoted to environmental topics tends to zero. There is, therefore, a pressing need to revitalize the curriculum and supplement materials to a certain degree to promote ecological awareness. According to Allwright, “there is a limit as to what teaching materials can be expected to do for us. The whole business of the management of language learning is far too complex to be satisfactorily catered by a pre-packaged set of decisions embodied in teaching material” [13].

So, relying on the textbook as the sole instructional guide, without any extra sustainability-related material will not contribute to systematically building ecological awareness into English courses. Another matter for concern is that reading materials students are exposed to are disputable from an ecological perspective, as they venerate unlimited urge of mankind to consume things (tourists’ consumption of places, the joy of shopping etc.), which stands in sharp contrast to environmentally-oriented topics in the same syllabus. Arran Stibbe claims that such stories underpinning “our current unsustainable civilization” lead “to ecological destruction and social injustice” and stresses the importance of “finding new stories that work better in the conditions of the world that we face” [14].

In the next step, the texts were automatically analyzed using the Stanford Natural Language Processing (NLP) techniques, the data obtained has the advantage of making the procedure more transparent and objective. The text was sent to the CoreNLP library for automatic identification of emotionally loaded substance in text. CoreNLP first splits the text into individual sentences and then decides whether the sentiment of a given text is positive, negative or neutral (Table 2).

Table 2. Sentiments expressed in SDGs-related texts.

<table>
<thead>
<tr>
<th>Textbook title</th>
<th>Text</th>
<th>Sentiments expressed in texts (sentence-level classifier)</th>
<th>Prevailing tonality of the texts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>positive</td>
<td>negative</td>
</tr>
<tr>
<td>Speak out</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethical man</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Low tech solutions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The long journey to a new life</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air pollution tracking (video script)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What’s yours is mine!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One woman’s ‘no spend year’, and how she survived</td>
<td></td>
<td></td>
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</tbody>
</table>

The results obtained demonstrate that the majority of the selected texts possess mainly neutral emotive components, although there is some inaccuracy in automatic text processing due to word sense ambiguity, which cannot be always resolved within the sentence. For instance, the sentence “Meet the slow theatre” in the text “Low tech solutions” is labelled as negative based on the word ‘slow’. Broader context (at the level above the sentence) is required to resolve the ambiguity: in the environmental context ‘slow’ is synonymous with ‘sustainable’, therefore, the sentence should be labelled as positive. Human language is...
difficult to analyze, computational linguists have been doing research to improve the word disambiguation and assume that “NLP can be applied to obtain relevant results and make predictions with around 80 percent accuracy [15].” Hence, we consider that our results are largely reliable with some inaccuracy needing manual verification.

Thus, the SDGs-related texts contain mixed sentiments, with neutral sentiments prevailing. In our view, these results seem to indicate the necessity of exposing students to more expressive, emotionally charged types of text, both literary and informational ones, as influencing both emotional and intellectual spheres of an individual will help pave the way for a more holistic perception of the world as the source of material and spiritual values for human beings.

4 Discussion

The promotion of ecological awareness among students can be effected through consistent incorporation of SDGs-related issues into every textbook unit by modifying and supplementing the textbook with extra material and activities. Two strategies can be utilized:

Strategy A implies endowing students with expertise (high status) by assigning them the role of a person who is, for instance, a member of an imagined language research community (an ecolinguist) or a part of an imagined world conservation community; students are asked to formulate their expert opinions in accordance with the topic of the unit. Such approach turns the normal classroom hierarchy upside down, thus providing “added value” to students, as it prompts them to think and talk and share. Such “expert reports” should be presented on a regular basis (at the end of each unit), thus promoting reflective thinking. In order to avoid monotony, ways of presenting information can be varied: being interrogated on a hotseat, giving elevator speeches, conducting expert meetings, conducting expert interviews in pairs, conducting mock trials with focus upon perpetrators of an unsustainable future etc. In order to successfully employ this strategy, we suggest beginning the course with a “kick-off meeting” that introduces students to the 17 sustainable development goals and key concepts of ecolinguistics. Thus, the SDGs-agenda will permeate through the whole course, which will help students absorb the SDGs-related material and realize the scope of the problem (because in textbooks sustainability concerns are treated as discrete problems and are often narrowed down to environmental issues, while social justice issues are left out of consideration); it will allow also teachers to direct students towards a more sustainable future.

Strategy B implies integrating SDGs-related material into existing material, in that case it is important to make sure that there is a smooth and logical segue into the environmental issues. The following options are possible:

- adding discussion questions to the reading section in the textbook and providing additional follow up reading material for interested students (there is no need to overwhelm students with too many sustainability-related questions, 2-3 questions will suffice); we suggest addressing local environmental problems following “think-globally-act-locally” principle, as studying local and regional environmental issues has high ethical potential;
- expand the scope of grammar and vocabulary activities by adding environmentally bound sentences (e.g. in a complete-question-tags-exercise following sentences can be added: “School closures caused by the pandemic have had adverse consequences for children’s learning, _____?”; “The pandemic’s economic crisis caused a sudden spike in unemployment around the world, _____?”);
- including where appropriate the use of literary texts (Japanese short poems, essays on nature, environment-related short stories i.e. bite-size texts that are specifically tailored to the course) to help mold students’ emotional responses to natural phenomena;
- increasing awareness of individual responsibility by asking students to calculate their own carbon footprint and share their results with the whole class.
These strategies can be employed separately or jointly and require a thoughtful review of a course syllabus.

5 Conclusion

Results of this research show that reconceptualization of the course framework is needed to incorporate sustainability concepts and contents into exiting English textbook units, where percentage of topics related to the Sustainable Development Goals ranges from zero to nine percent; it leads to superficial perception of issues, which is unsatisfactory. This paper presents practical suggestions to language teachers in terms of what strategies can be employed to develop a more holistic worldview and promote ecological awareness without fundamentally restructuring the whole textbook.

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