

## ECOLOGICAL EDUCATION AT THE CROSSROADS BETWEEN ESP, THE LIFE SCIENCES AND THE HUMANITIES

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**Abstract.** *Given the new plethora of challenges that young learners are facing, both culturally, health-wise, and on a personal identity/sanity level, the paper makes some major points on possible solutions coming from the academic humanities, with a focus on the need for meaning, communication, and self-expression. We have identified some of the most pressing of these challenges by analyzing the students' portfolios, including project work, and personal reflections handed in during the academic year 2024-2025, and drawing some tentative conclusions: limited attention-span, impaired sense of self-identification and self-development, overwhelming sense of loss as a result of information overload, fake-everything menace, copied/plagiarized reports/project work made by generative AI, trust collapse, reality distortion, and automated feedback which has almost entirely replaced organic biofeedback. In previous research, we have focused more on learning content and materials specifically targeting ESP (English for Specific Purposes and English for the Life Sciences). In the present study, we are compelled by the urgent necessity to address more general cultural aspects which also fall within the scope of the humanities. From the point of view of bio- and ecosemiotics, these issues may best be targeted through language-developing and communicative methodologies such as those made available in the English learning environment.*

**Keywords:** *Ecological Education, English for Specific Purposes (ESP), language learning, communication, didactic strategies.*

### INTRODUCTION

In recent years, Ecological education has emerged as a large research domain at the intersection between the life sciences and the humanities, promising to become a relevant agent of change. This framework also builds on semiotic approaches, resulting in a growing bulk of edusemiotic research which is relevant both for education and for the pressing challenges we are facing (SEMETSKY & STABLES, 2014; STABLES & SEMETSKY, 2015; SEMETSKY, 2017). Due to the aggressive progression of artificial intelligence tools and automated biology, the discussion has largely shifted from an understanding of biology as phenomenology to programmability (ABUDAYYEH & GOOTENBERG, 2024), triggering major unintended consequences for education. The cultural sphere and the humanities – language studies, biosemiotics, sociology, anthropology, and psycho-pedagogy all have a great stake in finding applicable remedies to these ills which have impacted students' lives, learning capabilities, and communicative competencies. Young learners are rapidly losing their grip on personal self-development, on acquiring metacognitive and soft skills, and this is unlikely to be conducive to a balanced social environment in the long run.

Building upon the aforementioned context, this research proposes several key educational interventions. Prominent among these are the cultivation of ecological literacy and related ecolinguistic competencies, deemed particularly useful for learners pursuing disciplines within the Life Sciences (e.g., biology, biotechnologies, plant science, animal science, food science, etc.). Furthermore, the integration of biosemiotic vocabulary and conceptual tools within the "Ecological English" curricula (DRAGOESCU, 2022) is proposed as a means to

present the biofeedback loops inherent within the biosphere, elucidating the interrelationships between biological systems, cultural concepts, and communicative processes. As proposed by biosemiotics, it is essential to overcome the divide between natural sciences which target modelling of mechanisms and the humanities, which pursue meanings and value (SHAROV, 2024).

The paper relies on basic tenets highlighted by biosemiotics in an interdisciplinary dialogue with edusemiotics, considering that language learning is integrated within the larger context of cultural communication. One of the major principles of this research field is that not only cultural, but also biological processes are all derived from the communicative or dialogic nature of life (KULL, 1998), following that meaning-making is coextensive with life, in “the great chain of semiosis” (HOFFMEYER & STJERNFELT, 2015). Thus, the semiotic lexicon encompassing concepts such as meaning, dialogue, and text, mirroring the terminology prevalent in biology and molecular genetics, has fostered a synergistic exchange of conceptual frameworks. This cross-fertilization has enriched the academic domain of language studies, especially ecolinguistics, along with the larger scope of education studies and humanities in general.

#### **MATERIAL AND METHODS**

The methodology of this research builds on sustainable language learning and qualitative research, while also relying on the ecolinguistic approach to holistic educational and communicative models (STONE & BARLOW, 2005; Van LIER, 2004). Qualitative research in language teaching and learning has taken a massive turn towards holistic approaches and sustainable communication within environments which deploy “ecoliteracy” (ecological literacy) or ecological methodologies of language learning (DRAGOESCU, 2022). Among the more recent qualitative approaches to language education, the study draws on ecosemiotics, which views communication in relational and dialogic terms, as a complex network embodied and embedded into an environment.

The study also inquires into research on constructive language education, such as language ecology and complex systems theory. These especially highlight the transformative potential of language learning processes, the relevance of interactions among peers/the environment and co-constructive identity formation (FEKETE, 2020; KRAMSCH, 2009). Including elements of ecosemiotics in ecological education is relevant because it enables students to comprehend the complexity of our interrelatedness with the environment.

#### **RESULTS AND DISCUSSIONS**

Despite focusing on learning content and materials in previous papers, specifically ESP (English for Specific Purposes and English for the Life Sciences), we feel the urgent need to also address more general cultural aspects which also fall within the scope of the humanities and which may best be targeted through language-developing and communicative methodologies. Though linguists have long stressed mainly the relevance of terminology and quantitative aspects, authors have recently shifted focus to underscore the primacy of cultural and linguistic acumen in facilitating a more profound comprehension of diverse phenomena and enhancing pedagogical efficacy, particularly within language instruction. This perspective posits that “proficiency in a language and deep understanding of whatever phenomenon can be more helpful in matters of culture and especially in language teaching rather than technical terminology and statistics” (DRAZDAUSKIENE, 2025:31).

Drawing on the literature in the field, as well as personal observations and shared exchange of best teaching practices with peers, we hypothesize that building skills in verbal expression is no longer sufficient for learners to find their way in the current information jungle. What is needed, above the given contents to be acquired in any given field of knowledge, is a larger cultural awareness in personal self-expression and more largely in social communication.

The complexity of the language-culture interplay, and especially the dependence of any given language on a particular culture and cognitive model is a largely established fact (DE BOT, 2017). Besides linguistic typologies, culture has been shown to comprise a vast array of values, modes of perception, and values. The personal set of values is generally constructed based on this larger shared system of values which a community (now a global one) has been internegotiating. Taking a global community into view means opening up an immense space of partially overlapping values, but also the need to accept and comprehend a variety of cultural difference, and the impossibility to narrow down the meaning of human culture on a shared scale of functioning.

There is no prescription on a general methodology, as fluidity of meaning must be integrated in context, in various sociocultural aspects, which are, in turn, embedded in language (KRAMSCH, 1993). This is why biofeedback and complexity theory must be taken into consideration to view language as a non-linear dynamic complex system in a holistic manner, as shown in by Larsen-Freeman (2011; 2017), Chang & Zhang (2018), and Dragoescu Urlica & Stefanović (2018). Based on the complex systems approach, this dynamics has also been connected to the need for acquiring transversal competences in order to maintain the ecology of learning (REȘCEANU & TILEA, 2020; REȘCEANU, 2020:116). The complexity of culture systems has also been shown to be interdependent with various aspects the coherence of which might ensure optimally balanced results (OKROS & POP, 2014:134).

New fields of research have emerged around the ecological and systemic paradigm, such as environmental humanities or environmental phenomenology, ecolinguistics, biosemiotics and ecosemiotics, addressing semiotic dynamics in nature and culture, as well as communicative relations across ecosystems. Such approaches represent an interdisciplinary source of inspiration for ESP teachers or for compiling communication studies curricula for students in academic fields related to the natural sciences. For instance, ecosemiotician Timo Maran (2021) views cultural-ecological systems in close interdependence, as he specializes in Environmental Humanities and zoosemiotics (sign-based communicative patterns in animals).

By analyzing the relation between meaning and context from an ecological view standpoint, Maran has developed “an integrated methodology of ecosemiotics: The concept of nature-text”. By this token, a garden becomes a type of “nature-text” or landscape-text, at the confluence between human and non-human dimensions. Such perspectives play a major role in the current humanities, as they lay emphasis on the meaning-making and communicative aspects at the core of living systems. The relevance of placing value on meaning relations and immaterial but essential aspects such as interrelatedness and interdependency of living systems based on communication may only be holistically understood at the meeting point between the sciences and humanities. As concluded by Maran (2007), the resulting synthesis and the nature-text model he proposes have the potential to account for “the semioticity of nature”.

To exemplify the holistic methodology of this approach, we posit the following basic principles. Language is seen as a resource, rather than a set of rules; by employing functions of meaning, within and beyond language, we are all interrelated; language is also seen in context, as a tool of social interaction and as a semiotic system, in purposeful reference to meaning and

general worldview. Furthermore, Halliday (1992) proposes that use of language displays several semiotic functions: 1) the Textual function (how information is organized in a text); 2) the Experiential function (relating our experience of the world); 3) the Interpersonal function (generating interpersonal relationships between producers and receivers of information). According to Halliday's (1992) model, communication is organized in culturally and context-appropriate levels, the highest of which is the Discourse-Semantic level.

Finally, the evolution of socially constructed meaning evolves in conjunction with processes of language learning, reality interpretation, and identity formation (FEKETE, 2021: 55). By training learners to understand holistic values and, these processes could evolve in a more ecological and participatory manner, in a systemic manner. Theoretical endeavors such as eco- and bio-semiotics have formulated tools to enable comprehension, interpretation, and communication of value-meaning to work together holistically.

### CONCLUSIONS

Integrating systemic functional linguistics, ecolinguistics, and bio-/eco-semiotics not only in our research, but also in our qualitative pedagogy plays an important role in helping students perceive systemic coherence beyond formal fragmentariness. As a result of mass entertainment and a deficient understanding of context in public social media, recent years have witnessed a rising trend of cultural violence and aggressive expression. Against the background of mounting mass of (mis)information, we should prepare undergraduate students for cultural shifts or risk finding ourselves faced with the breakdown of communication. Moreover, we ought to become aware of our ethical role in healing the planetary body in a common remedial effort by engaging in an exploratory dialogue with nature, not just technology. As shown, information pervades nature and acting in a participatory manner, we may evolve towards a more coherent field of unitive understanding of the world. Beyond quantitative parameters, our ecological engagement with nature holds the potential to reorient our societies towards more reverential and less exploitative ways of living.

The paper has shown that language and meaning-making processes also hold the key on an individual plane, as these are undeniably indicative expressions of one's cultural level and personal value system. In support of the latter, holistic pedagogy strives to develop an enlarged understanding of how the need for meaning impacts communities at the deepest level. Such holistic approaches which are welcome in the language class are a valid solution to helping students understand things in context and not unilaterally. For this purpose, learners are encouraged to complement their core academic fields of study by developing transversal competences, especially skills related to communication, cultural and socio-affective integration, which may enable them to perceive phenomena beyond academic settings. On a larger scale, we are targeting a reconsideration of the functions of communication with an aim to repositioning it within ecological parameters. To reconfigure our value system, pedagogical dialogic systems need to reframe communication in integrative terms. Finally, we suggest that the Holistic Human Resources Development (HHRD) model could incorporate social, cultural, as well as emotional intelligence, based on biosemiotic principles, in order to support the fundamental quality of human ecologies.

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