



Considerations about usability evaluation in a software for language teaching area

Considerações sobre avaliação de usabilidade em um software para a área de ensino de línguas

Consideraciones sobre la evaluación de usabilidad en un software para el área de enseñanza de idiomas

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ABSTRACT

This article presents the main results of the development and evaluation of the computational tool *LinguaComp*, designed to assess written production skills in the English language. The methodological procedures include the evaluation of this tool, carried out by twenty-six high school students, based on a set of questions related to two dimensions: technical and pedagogical. The results achieved for the technical aspects of usability demonstrate the identification of consistency and patterns in the nomenclature used in the buttons and menus, the effectiveness of the success and error messages, as well as the consistency in the presentation of the interface. Regarding the pedagogical aspects, the tool can assist teachers and students in the evaluation process, offering a computational environment and an interface for sending online tasks, feedback and reports that indicate quantitative and qualitative aspects of student learning.

Keywords: Language Teaching; English Language Assessment; Technological resources.

RESUMO

*Este artigo apresenta os principais resultados do desenvolvimento e avaliação da ferramenta computacional *LinguaComp*, elaborada para avaliar a habilidade de produção escrita na língua inglesa. Os procedimentos metodológicos compreendem a avaliação dessa ferramenta, realizada por vinte e seis estudantes do ensino médio, a partir de um conjunto de questões relacionadas a duas dimensões: técnica e pedagógica. Os resultados alcançados para os aspectos técnicos de usabilidade demonstram a identificação de consistência e padrões na nomenclatura empregada nos botões e menus, eficácia das mensagens de sucesso e erro, bem como a consistência na apresentação da interface. Com relação aos aspectos pedagógicos, a ferramenta pode auxiliar professores e estudantes no processo avaliativo, oferecendo um ambiente computacional e uma interface para o envio de tarefas on-line, feedbacks e relatórios que indicam aspectos quanti e qualitativos da aprendizagem dos estudantes.*

Palavras-chave: Ensino de Línguas; Avaliação da Língua Inglesa; Recursos tecnológicos.

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RESUMEN

Este artículo presenta los principales resultados del desarrollo y evaluación de la herramienta computacional LinguaComp, diseñada para evaluar las habilidades de producción escrita en el idioma inglés. Los procedimientos metodológicos incluyen la evaluación de esta herramienta, realizada por veintiséis estudiantes de secundaria, a partir de un conjunto de preguntas relacionadas con dos dimensiones: técnica y pedagógica. Los resultados alcanzados para los aspectos técnicos de usabilidad demuestran la identificación de consistencia y patrones en la nomenclatura utilizada en botones y menús, efectividad de los mensajes de éxito y error, así como consistencia en la presentación de la interfaz. En cuanto a los aspectos pedagógicos, la herramienta puede ayudar a profesores y estudiantes en el proceso de evaluación, ofreciendo un entorno computacional y una interfaz para el envío de tareas en línea, retroalimentación e informes que indican aspectos cuantitativos y cualitativos del aprendizaje de los estudiantes.

Palabras clave: Enseñanza de idiomas; Evaluación del idioma inglés; Recursos tecnológicos.

1. INTRODUCTION

Information and Communication Technologies (ICT) have been evolving exponentially in the most diverse areas that make up everyday life (Passero et al., 2016). In the educational area it has not been different, mainly with regard to the alignment of these technologies to the use in studies in electronic media in the most diverse areas of knowledge (Bastos, 2010).

Considering the teaching area, we highlight in this study, the use of technological tools to assist the teacher in the teaching, learning processes and, mainly, assessment of communicative competence in a target language and the skills necessary to develop it.

This theme is justified due to the need to enhance the use of technological resources in the teaching and learning process, considering the integration of technologies in the educational context and proposing alternatives to the evaluation process of the English language, with an emphasis on written production. In this context, some authors highlight the absence of tools to support the planning of learning, both at the beginning and during the classes, along with the need to align these developed actions with the pedagogical documents and training demands (Rosenfeld et al., 2001; Alencar; Campos, 2016; Coelho, 2019a).

In general, language teachers have used some differentiated resources, among them, "WhatsApp [...], in addition to Facebook and e-rubrics (to a lesser extent)", however traditional written tests remain "instruments used to verify the contents given in the classroom, mainly aimed at valuing the acquisition of grammatical knowledge, linguistic analysis and vocabulary" (Coelho, 2019a, p.191).

This scenario highlights the need for new pedagogical practices, especially aimed at a process that can integrate, teaching, learning and evaluation, with the use of tools that can assist in this training process, taking into account the large amount of data and information that can be generated with learning activities and progress in developing students' skills in the target language.

In view of this situation, in this article we aim to present the development process of LinguaComp, an educational product developed in the Professional Master's Degree in Technological Education, from the Federal Institute of Education, Science and Technology of Amazonas, and to discuss the results of a usability test of this software, carried out by twenty-five students of the English Language (EL) discipline, of an Integrated High School Technical Course in Chemistry and the accompaniment of the class teacher.

The usability test involved the adoption of a questionnaire to evaluate the software, focusing on technical criteria, which include ergonomic aspects of human-computer interaction (Nielsen, 1995; Reategui et al., 2010) and pedagogical (Broadfoot et al., 1999; Roméu Escobar, 2006), as well as the observation of use (Jesus et al., 2010), in order to highlight some opinions and reactions of the students and the teacher regarding the use of the educational product.

In view of the above, this article is organized into four sections, namely: Fundamentals of communicative competence and assessment; LinguaComp: presentation and development process; Methodological procedures; Results and discussions, followed by final considerations and references.

2. COMMUNICATIVE COMPETENCE AND EVALUATION

The assessment of communicative competence in language teaching, specifically in the English language, has been the object of research, due to the existence of several gaps pointed out in the literature. Some of these gaps are characterized as problems in the assessment, within the scope of the EL, highlighting: "meaning of evaluation still based on the measurement of objective, stable and universal curricular contents" (Duboc, 2015, p. 675).

Such gaps show the need for new practices to assess students' productions in the language, both written and oral, as well as to identify the needs and difficulties that arise in the teaching, learning and evaluation process. According to Stoll et al. (2019, p.1), "in virtual environments, records of students' productions, activities and interactions are automatically collected, enabling a complete analysis of learning. However, the volume of data can be very large", demonstrating the urgency of new educational products that can contribute to the teaching work and the students' learning.

It is worth noting that the use of the computer has been characterized in the literature as "an additional teaching-learning tool, it has been fundamental for the development of software applied to education" (Garcia, 1994, p.19), which may contribute to the teachers can collect, store and manage different data from their students, with the aim that, from them, they can have quantitative evidence and identifiers that allow valuing the process and directing new learning paths.

In this sense, Miccoli (2012, p. 59) describes that one of the challenges pointed out by English language teachers is the evaluation of learning, because "the teacher needs to work with different evaluation proposals, which he does not always understand, in line with the development of skills language-specific".

In the case of EL, we can mention problems such as the development of the written production skill, which is signaled in the literature as a challenge for language learning, taking into account the need to strengthen the association between grammar and vocabulary of the language in a contextualized way (Barbosa, 2015).

In view of this scenario, for this investigation, we took the discipline of EL, with a focus on written production, considering the importance of developing this skill in the teaching of additional languages (Barbosa, 2015) and developed a computational tool, called LinguaComp, with the in order to assist teachers and students in the evaluation process.

3. LINGUACOMP: PRESENTATION AND DEVELOPMENT PROCESS

LinguaComp is an educational product developed during the Professional Master's Degree in Technological Education, from the Federal Institute of Education, Science and Technology of Amazonas, arising from the research intitled: "LinguaComp as tool in teaching language learning: a proposal for the development of written English skills".

With LinguaComp it is possible to create, evaluate and monitor tasks that enable written production in the English language, in addition to registering skills (knowledge, skills, attitudes) related to this area of expertise. The software can be accessed through the website <https://www.linguacomp.pro.br/>, created to disseminate the research carried out.

LinguaComp's main purpose is to assist teachers and students in assessing knowledge and skills of written production in the English language. Its name derives from the combination of two words (languages and skills). Figure 1 shows the task screen and the evaluation functionality.

Figure 1 - Screen for task evaluation

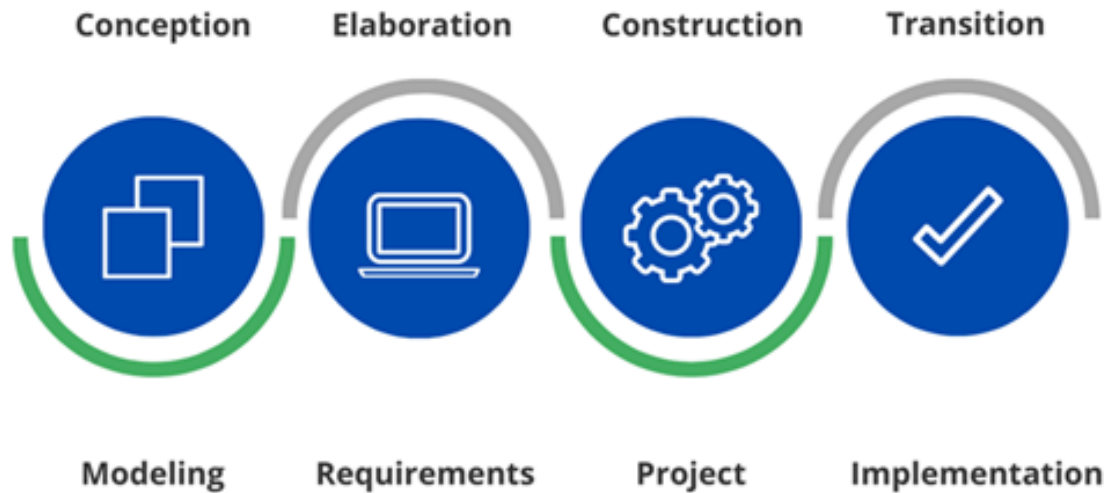
Descrição	Tipo	Data limite	Autoavaliação?	Ações
Fase Orientação: Vamos iniciar a escrita de um diário online	Escrita	11/12/2019	Sim	Avaliar
Fase Textualização: Escrevendo um diário online	Escrita	11/12/2019	Sim	Editar
Fase Autorevisão: Texto final	Escrita	11/12/2019	Sim	Remover

Source: The authors (2025).

This software was created based on the following objectives: i) to provide an interface for registering, editing and consulting skills (knowledge, skills and attitudes); ii) make a database available, with rubrics, to serve as a reference for the construction of these assessment tools for assessment in language teaching; iii) enable a computational environment for evaluating activities, through the construction of rubrics; iv) proposing to teachers a system aimed at assessing written production, with an emphasis on participatory assessment modalities; v) provide follow-up reports on evaluations; vi) provide students with follow-up and management of results from assessments and performance of skills developed in the target language.

For the development of this computational tool, with a web-based architecture, software development methods were used, covering all the necessary steps including, requirements gathering, modeling, coding and prototyping, implementation and validation. Considering the short term for implementation, we chose the Agile Unified Process (AUP) as a software development method (Larman, 2011). Figure 2 summarizes the phases employed in the development of LinguaComp.

Figure 2 - Phases of the LinguaComp development process



Source: The authors (2025).

The choice of technologies for designing and preparing the development environment involves the need for agility in the development process, easy access to documentation and availability of technology on the Internet. During this process, the Javascript programming language was chosen for the development of the application's Front-End, implemented using Node.js, and complemented by the Angular and Material Design Frameworks. For the application's Back-End, the Java programming language was chosen and complemented by the SpringBoot framework. The Database Manager System chosen was MySQL.

In order to evaluate the usability of the tool, we developed production activities written in EL, using LinguaComp. These activities were applied in hybrid mode, during three EL classes that are part of a proposal organized in three phases, which are interrelated and complement each other, called: 'Orientation', 'Textualization' and 'Self-review, integrating cognitive factors, communicative and socio-cultural (Domínguez García, 2006). The proposal was initially evaluated by an ad hoc committee of five expert judges in the EL teaching area, in order to ascertain the pertinence and clarity of the items that make up the proposal in each phase for later application during the use of the LinguaComp software.

4. METHODOLOGICAL PROCEDURES: USABILITY EVALUATION OF LINGUACOMP

The usability evaluation of LinguaComp took into account technical and pedagogical criteria, based on a survey of the area's literature on software evaluation in the educational field (Reategui et al., 2010; Silveira; Carneiro, 2012; Araújo; Freitas, 2017), as well as the use observation technique (Jesus et al., 2010).

Thus, in the evaluation of LinguaComp, we considered the technical criteria, which include ergonomic aspects of interaction-man-machine, and pedagogical aspects, to identify the epistemological approach adopted, aligning the use "[...] to the pedagogical practices that we seek to implement" (Reategui et al., 2010, p. 2).

According to Reategui et al. (2010, p. 7), "the set of questions related to the technical aspects of the learning object contributes to the evaluation of usability aspects of its interface", as well as "the lack

of usability can affect negatively the use of a product". Thus, usability test methods were used (NIELSEN, 1995), in which the technical criteria include the ergonomic and pedagogical aspects, inspired by the software evaluation protocol of Araújo and Freitas (2017), as these aspects offer theoretical and methodological contributions. That make it possible to identify the difficulties related to the interaction between man and machine, with the objective of "achieving balance, comfort, satisfaction, safety and efficiency in the use of computerized products and tools" (Andres, 1999 apud Araújo; Freitas, 2017, p. 391).

The usability evaluation of the use of *LinguaComp* aimed to verify the quality of the educational tool, with the students, to identify the main difficulties encountered in its usability. In this context, it is a relevant ergonomic aspect in several areas of knowledge being defined as "the ability of a product to be used by specific users to achieve specific objectives such as effectiveness, efficiency and satisfaction in a specific context of use" (ISO 9241-11, 1998).

In addition to the technical aspects, authors such as Silveira and Carneiro (2012) also consider the need to include and detail guidelines aimed at pedagogical issues that can assist as a parameter for evaluating software. These are criteria related to the process of teaching, learning and assessing skills in the target language, based on the objectives proposed by the activities (development of aspects of the language), the development of autonomy and the participation of students in the assessment (self-assessment) and in aspects related to the operationalization of this process, based on the recognition of the evaluated criteria, the use of resources for evaluation, the management of these data and the feedback provided during the training process.

With regard to pedagogical aspects, we use as main epistemological conception for the development of the tool, the cognitive-communicative and sociocultural approach (Roméu Escobar, 2006), which covers, among other aspects, the interrelation between thought and language and the dependence of these factors on socio-cultural context. We also consider the assessment approach focused on learning, which takes into account the following key factors: effective feedback to students, involvement of students in their own learning, adequacy of teaching, considering the results of the evaluation, necessity and involvement of students in the self-assessment process (Broadfoot et al., 1999).

It is worth mentioning that eight of the ten heuristics proposed by Nielsen (1995) were used as a reference for the composition of eleven questions that were answered by users, being the following: i) agreement between the system and the real world; ii) control and freedom for the user; iii) consistency and standards; iv) prevention of errors; v) minimizing the user's memory load; vi) minimalist and aesthetic design; vii) error recognition, diagnosis and recovery; viii) help and documentation and observation.

Was created using a Likert Scale to measure the degree of agreement in the different aspects of using the *LinguaComp* tool, considering five points: I totally disagree; I disagree; Neither agree nor disagree; I agree and I totally agree. The questions and scale are describes in Frame 1 of this work.

Frame 1 - LinguaComp evaluation questionnaire

GENERAL USABILITY OF LINGUACOMP
<ol style="list-style-type: none"> 1. The fields for answering a new task are easy to easy understanding and comprehension 2. The filled in fields are sufficient to attend a written production 3. Buttons have a description that is easy to understand and comprehension 4. Success or error messages are clear and easy to understand 5. The software quickly informs you when a certain action is being performed 6. The software communicates clearly in terms familiar to the user 7. The terms and expressions used in LinguaComp have a language that is easy to understand and comprehension. 8. Software has options to 'Back' and 'Exit' wrong actions 9. The navigation features (menus, icons, links and buttons) of the software are clear and easy to identify. 10. Error messages in LinguaComp are clear and explanatory 11. The LinguaComp user guide presents suitable indications for use

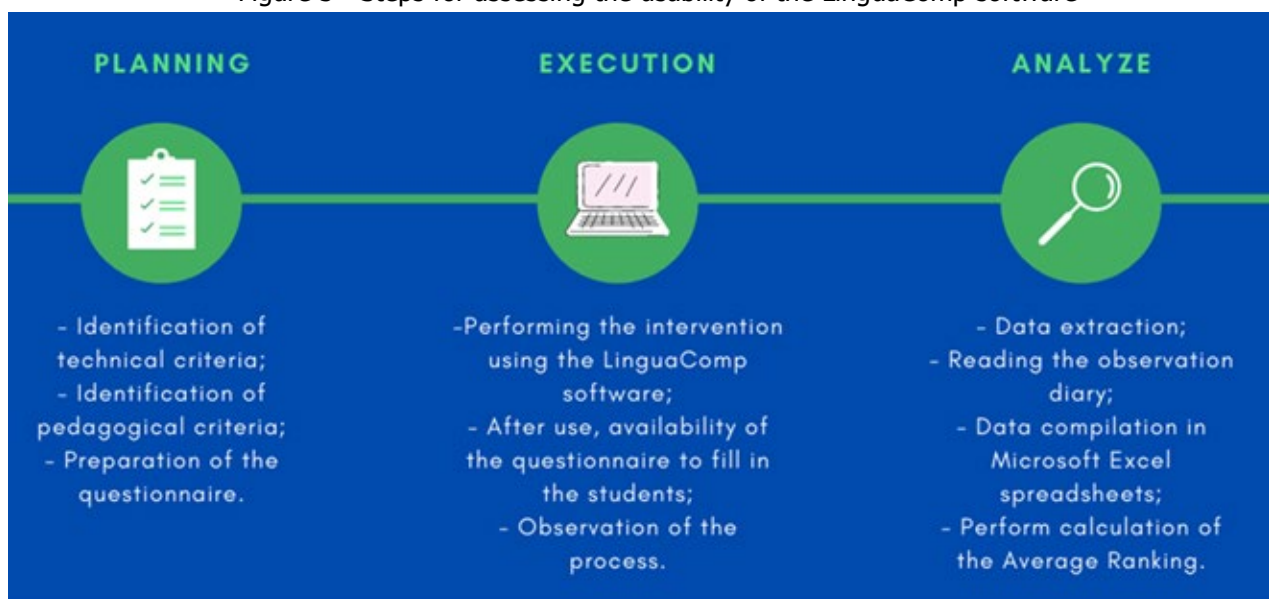
Source: The authors (2025).

Data collection took place in a class of twenty-five students, from the Technical Course of Integrated Middle Level in Chemistry, from the Federal Institute of Education, Science and Technology of Amazonas, in the subject of EL, selected for convenience, considering the teachers who were interested in use new resources to assist in the assessment process.

To analyze the results, we used the calculation of Average Ranking (RM) which considers the frequency of responses and weighted average, divided by the number of participants (Severo, 2014; Oliveira, 2005), in which the value closest to five is considered, as the highest level of agreement.

Figure 3 describes in general the steps and activities carried out during the evaluation of the usability of LinguaComp software.

Figure 3 - Steps for assessing the usability of the LinguaComp software



Source: The authors (2025).

In the planning phase, activities were carried out to identify technical and pedagogical criteria to be considered in the usability test of LinguaComp. At the end, they were gathered in a questionnaire.

In the execution phase, intervention activities were carried out to use LinguaComp software. After using the software, the questionnaire was given to the students. Observation activities were carried out in these processes.

At the end, data were collected from the forms and analyzed using Microsoft Excel. The calculation of the Average Ranking (RM) was applied. In the next section, we explain the results of LinguaComp's usability test.

5. RESULTS AND DISCUSSIONS

In this section, we highlight the main results related to the LinguaComp tool, based on technical and pedagogical aspects. Frame 2 shows the values resulting from the RM calculation for each statement in the tool's evaluation questionnaire.

Frame 2 – Results of the RM calculation per question

AFFIRMATION	I TOTALLY DISAGREE	I DISAGREE	NEITHER AGREE NOR DISAGREE	I AGREE	I TOTALLY AGREE	RM
The fields for answering a new task are easy to understand and comprehension	0	3	2	14	6	3,92
The filled in fields are sufficient to attend a written production	0	1	4	17	3	3,88
Buttons have a description that is easy to understand and comprehension	0	0	3	17	5	4,08
Success or error messages are clear and easy to understand	0	2	4	12	7	3,96
The software quickly informs you when a certain action is being performed	0	1	5	14	5	3,92
The software communicates clearly with terms familiar to the user	0	1	6	14	4	3,84
The terms and expressions used in LinguaComp have a language that is easy to understand and comprehension	0	1	6	11	7	3,96
The software has options to 'Back' and 'Exit' wrong	0	6	7	6	6	3,48

actions						
The navigation features (menus, icons, links and buttons) of the software are clear and easy to identify	0	1	6	14	4	3,84
Error messages in LinguaComp are clear and explanatory	1	3	6	12	3	3,52
The LinguaComp user guide provides appropriate indications for use	1	1	6	13	4	3,72
Overall Average Ranking						3,83

Source: The authors (2025).

It is observed that the RM that comes closest to 5, refers to the easy understanding of the purpose of the buttons to perform the tasks of written production (4.08), an issue associated with heuristics: consistency and patterns, minimizing the memory load of user. Such elements are indicative of the efficiency of the software that facilitate its use, considering the sufficiency of the actions of a screen. Still in this regard, we highlight the importance of using terms that are close to the reality of the users of the software, considering that the "user should not have to remember information from one part of the dialogue to another. The instructions for using the system must be visible or easily retrievable whenever necessary" (Peixoto; Freitas; 2013, p. 31).

The results also deal with the effectiveness of LinguaComp success and error messages, related to heuristics, error prevention and recognition, diagnosis and recovery of errors, with the RM of 3.96, pointing to the agreement of the item evaluated by the students. The importance of successful messages in software is pointed out as a quality characteristic that demonstrates care with the design and user experience to minimize problems that may occur during use (Nielsen, 1995).

We also observed, in technical aspects, in relation to the LinguaComp interface, the presentation of information, guidance and navigation, both with RM 3.96, indicating that the terms and expressions used in the tool have a language that is easy to understand and understand, showing acceptability and agreement on the visual consistency of the information.

Among the main points to be improved in the LinguaComp interface, students pointed out: i) more buttons and keys, more dynamics and more editing options (E4); ii) confirmation that responses have been saved and sent (E8); iii) the task description could be more detailed on the website (E26).

In these points highlighted by the students, it is worth considering that meeting the "effectiveness of the teaching and learning process is supported by technology, pedagogical issues and cognitive, affective and relational aspects" (Bordin, 2018, p.73), that is, in addition to the ease of use of the LinguaComp software, it is necessary to enhance assistance in the pedagogical and cognitive issues of its interface.

On the other hand, the pedagogical aspects take into account the data obtained by questionnaires and observation performed during the use of LinguaComp in the production activities written in EL. The main results pointed out by the students and the teacher refer to the availability of resources

that promote interaction between students, enabling the discussion during the phases of using the tool and the presentation of content in an appropriate manner to the level of learning. According to the students: i) presents a faster and more practical means of textual production and carrying out activities for study (E1); ii) the software is very simple to use, its functions are very clear and it is educational (E12); iii) develop writing in English in an easier way (E14); it was super affordable, I understood the use. I liked the white theme, and the design (E24).

The results show that we must consider necessary characteristics in a well-designed software interface: “conduction, affectivity, consistency, the meaning of codes and denominations and error management” (Lima et al., 2007, p. 41). These features make it easy for users to use the software.

With the use of LinguaComp, the participants had access to a computational interface that included an evaluative rubric, which was built with the aid of the tool, based on the use of criteria, a qualitative description of these criteria and performance levels. The rubric is presented on a digital screen, in which the professor of the discipline can assess, from the pre-determined criteria, the level of performance of the development of the written production skill in the target language (Figure 4).

Figure 4 - Task evaluation screen in LinguaComp

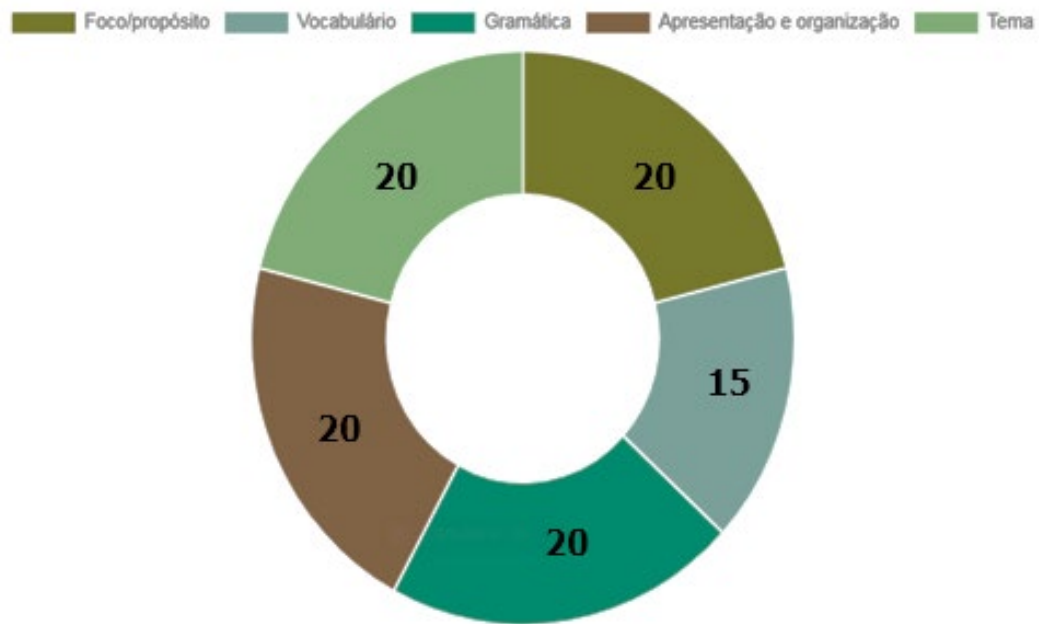


The screenshot shows a web interface titled "Avaliar Tarefa". At the top, it says "Nome do Aluno" followed by "Aluno 1". Below this is a table with four rows, each with a dropdown arrow on the right. The rows are labeled "Tarefa", "Resposta", "Rubrica", and "Comentário(s)". The dropdown arrows for "Tarefa" and "Resposta" are circled in red. At the bottom left is a button labeled "Voltar" and at the bottom right is a button labeled "Salvar e Prosseguir".

Source: The authors (2025).

Still with the use of LinguaComp it was possible to have access to the data of the evaluations carried out in the texts sent by the students, through the applied proposal. The tool allows the generation of individual graphs so that the teacher has access to the data of each student, based on predetermined criteria. In Figure 5, we present the model used during the implementation and evaluation of the tool using five criteria (Focus / purpose, vocabulary, grammar, presentation and organization and theme) and the respective score for each of them.

Figure 5 - Individual performance graph

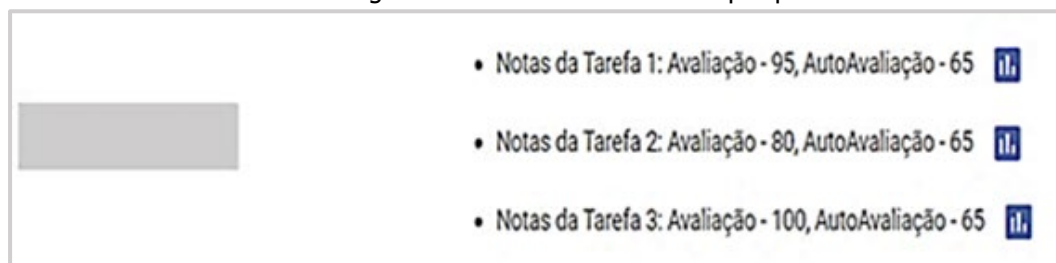


Source: The authors (2025).

Through the graphics that are generated in the tool, it is possible to view all the evaluated criteria with the respective score at the level. Values referring to the scores of each criterion are presented, based on a color scale, based on the qualitative performance of the students, according to the rubric that “[...] provides meaning for the attribution of grades” (Mendonça; Coelho, 2018, p. 110).

This aspect can help the teacher and students to understand their difficulties and progress in carrying out the activity, based on the qualitative description of the criteria used for the activities. In this perspective, considering that most educational institutions require a score corresponding to the student's performance, these data can be generated by means of a numerical value from 0 to 100, which represents the sum of the evaluated criteria. This material can assist teachers in managing data and organizing it to compose a grade in their respective academic systems. In Figure 6, we have as an example, the notes referring to the evaluation carried out by the teacher, derived from the sum of the qualitative criteria and also a note generated by the self-evaluation, carried out by the students.

Figure 6 - General class follow-up report



Source: The authors (2022).

Considering the pedagogical criteria adopted for analysis, the results show the main artifacts generated that assist in the process of evaluating written production in EL, such as: i) a computational environment for sending tasks online; ii) the interface for evaluating written production, through a rubric; iii) the possibility of generating data related to self-assessment that can be performed by students; iv) fields for sending textual feedbacks to students; v) general and individual monitoring

reports, with quantitative / grade and qualitative data, using the criteria adopted in the rubric, which are enlarged by individual graphs that indicate the performance of students in the evaluated criteria.

We understand as limitations of the usability test applied in LinguaComp the time spent to carry out the process of using the system. This limitation is directly linked to the need to align the use of the software with the teaching-learning proposal of the subject in question. Another limitation observed was the need to guide students about the evaluation procedure, because, even using a structured questionnaire with a Likert scale, some of the participants showed a lack of knowledge of this type of software evaluation.

6. FINAL CONSIDERATIONS

Regarding the technical aspects, the results showed elements of usability identified in the evaluation of the tool, such as the indication of consistency and standards in the nomenclature used in the buttons and menus, minimizing the memory load of the participants in the use of the tool, the effectiveness of the messages of success and error, as well as consistency in the presentation of the interface.

Through the pedagogical aspects evaluated, we highlight the main resources that facilitate and streamline the activities inherent to the evaluation process of the proposed activity: i) it offers a computational environment for sending tasks online; ii) it offers an interface for evaluating written production through the evaluation rubric in a dynamic way, without the need to print documents; iii) indicates data referring to the self-assessment carried out by the students; iv) provides fields for sending textual feedbacks to students; v) organizes data after the evaluation in general monitoring reports, with quantitative characteristics (grades), enlarged by individual graphs that indicate the performance of the students in each evaluated criterion. These resources strengthen the evaluation process and allow teachers new practices for carrying out evaluative activities.

The results show different aspects that can assist in the teaching work, especially in carrying out the evaluation process. We believe that the tool has a certain innovative content, due to the combination of resources that can provide new assessment practices, taking into account the potential use of rubrics to expand the description and knowledge of the qualitative criteria that are being evaluated, the promotion of self-assessment, which aims to make the student the protagonist of his own learning and the generation of reports, enlarged by individual graphics, which can assist teachers and students in the management and monitoring of the development of the written skill in EL, or other skills that the teacher wants to develop.

For future studies, we intend to expand new research on the tool, focusing on application in different contexts of teaching, learning and language assessment, as well as qualitative studies that can be carried out, considering different analysis variables and issues that involve the development of communicative competence. This scenario also involves the promotion of the evolutionary maintenance of LinguaComp, the realization of new research and intervention proposals based on continuous changes and progressively expanded functional content, aiming at the creation of new functionalities (Vasconcelos et al., 2017) and version management that can consolidate significant improvements of the tool for use in the language area. In addition, we aim to foster the impact of this tool, by expanding its use in the institutional context in order to enhance technological innovation in the adoption of new assessment practices.

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