

Validation of a WebQuest associated with media language: possibilities for teaching Zoology

ABSTRACT

This study emerged within the context of the resumption of face-to-face classes, aiming to reuse and reinvent the digital technologies employed during remote teaching throughout the COVID-19 pandemic. Our interest in investigating the WebQuest (WQ) arose from the following question: what are the possibilities of using a Zoology-focused WebQuest associated with media language in Science Education? Accordingly, this study aimed to investigate the possibilities of using a Zoology WebQuest associated with media language in Science Education, specifically seeking to validate the tool with specialists in Science Education and a Basic Education Science teacher. To this end, validation questionnaires were developed for the participants, including criteria related to the WebQuest's structure, problematization, pedagogical and conceptual appropriateness, and contextualization. The results indicated a positive evaluation of the WebQuest by both the specialists and the participating teacher, demonstrating its adequacy regarding structure and organization, problematization, pedagogical elements and concepts, content and conceptual accuracy, teaching and assessment processes, and alignment with school needs. The teacher's perceptions were also favorable toward the use of both the WebQuest and cinema, encompassing not only the manner in which these resources were employed but also the outcomes achieved in previous and current experiences involving the pedagogical intervention. Therefore, this research contributes to the educational field by discussing the use of WebQuests and media language in Science Education, expanding pedagogical resources and enriching theoretical understanding.

KEYWORDS: Science Education; Information and Communication Technology; Internet; Innovation; Audiovisual Language.

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Validação de uma webquest associada à linguagem midiática: possibilidades para o ensino de zoologia

RESUMO

O presente trabalho decorre de um cenário de retomada das aulas presenciais, visando reaproveitar e reinventar o uso das tecnologias digitais utilizadas durante o ensino remoto no contexto da pandemia da covid-19. Nosso interesse em pesquisar sobre a WebQuest (WQ) emerge a partir do seguinte questionamento: quais são as possibilidades de utilização de uma WQ sobre Zoologia, associada à linguagem midiática, no ensino de Ciências? Diante disso, este trabalho teve como objetivo investigar as possibilidades do uso de uma WQ sobre Zoologia, associada à linguagem midiática, no Ensino de Ciências, visando especificamente validar a ferramenta junto a docentes especialistas em Ensino de Ciências e a uma professora de Ciências da Educação Básica. Para tanto, foram elaborados questionários de validação destinados às participantes, com critérios relacionados à estrutura da WQ, sua problematização, adequação pedagógica e conceitual e contextualização. Os resultados indicaram avaliação positiva da WQ pelas especialistas e pela professora participante, revelando-se adequada em termos de estrutura e organização, problematização, itens/conceitos pedagógicos, conteúdos e conceitos, processo de ensino e avaliação e necessidades da escola. As percepções da docente também foram favoráveis ao uso da WQ e do cinema, englobando tanto a maneira como esses dois recursos foram utilizados quanto os resultados alcançados em experiências anteriores e atuais com a intervenção pedagógica. Assim, esta pesquisa contribui para o campo educacional ao discutir o uso da WQ e da linguagem midiática no ensino de Ciências, ampliando as ferramentas didáticas e enriquecendo o entendimento teórico.

PALAVRAS-CHAVE: Ensino de Ciências; Tecnologia da Informação e da Comunicação; Internet; Inovação; Linguagem Audiovisual

INTRODUCTION

In an environment characterized by constant change, such as education, it is essential that the triad of school, teacher, and student work in a coordinated manner to promote ongoing methodological innovation. In this context, Digital Information and Knowledge Technologies (DIKTs) have emerged as valuable allies in the teaching and learning process, making it possible to access information “at one’s fingertips,” which may, in turn, render both classroom and extracurricular activities more engaging and accessible (Guerra et al., 2022).

Given the dynamic nature of the internet, where a new reality is shaped by emerging media and technologies and by transformations in the ways individuals interact with the world, there is an increasing demand for the appropriation of digital culture (Cerigatto, 2020; Carvalho et al., 2023). The inclusion of all individuals in the digital universe thus becomes essential to foster more active participation and more effective integration into new forms of information and knowledge dissemination and appropriation (Cerigatto, 2020). The technological revolution has generated a wide range of possibilities and opportunities in education, offering students a more dynamic, interactive, and personalized learning experience. However, classroom practices still reveal a use of media and technologies that remains distant from the participatory logic promoted by digital culture (Cerigatto, 2020).

This issue becomes particularly evident when examining the reality of Basic Education teachers, which continues to be marked by numerous challenges. Due to the many responsibilities assigned to these professionals, opportunities to access and remain in environments such as computer laboratories are often limited. Moreover, integrating DIKTs into educational contexts requires investments in technological infrastructure as well as initial and continuing teacher education that enables the effective use of such technologies (Silva et al., 2024).

One possible approach to addressing this challenge is the incorporation of internet-based instructional strategies, such as the WebQuest (WQ), which may serve as a means of fostering more open and motivating learning environments. Created by Bernie Dodge, a professor at San Diego State University, United States, in 1995, the WebQuest is regarded as an active, inquiry-based learning methodology in which all or part of the information with which students interact is obtained from internet resources (Dodge, 1995). As proposed by Dodge (1995) and Bottentuit Junior (2017), a WebQuest consists of a series of essential stages designed to guide the development of learning activities in a structured and effective manner. Each of these stages plays a specific role in the appropriation of knowledge through online inquiry (Silva & Oliveira, 2022). In contrast to traditional pedagogical practices, the WebQuest emphasizes interaction and the transformation of existing information. Within this framework, educators act as authors of the learning experience, while students assume active roles in the teaching and learning process and in the construction of their own knowledge (Rocha, 2007).

At the beginning of 2020, the World Health Organization (WHO) officially declared that the spread of COVID-19 had reached pandemic status. As a result, public health measures were implemented worldwide to contain the spread of the virus. Among these measures, social distancing emerged as one of the primary

recommendations, requiring individuals to remain physically separated for a period of time in order to slow the increase in the number of people infected with the coronavirus (SARS-CoV-2). Within this context, virtual environments became the primary learning spaces in educational processes (Schuch & Conte, 2022), as one of the key measures adopted was the closure of schools and educational institutions.

It was within this scenario that the present study began to be developed as part of a University Extension Program affiliated with a public university in the state of Bahia, Brazil. Between 2020 and 2021, efforts focused on developing educational activities, particularly the creation of innovative pedagogical methodologies that incorporated digital technologies and media language—especially animated films—into Science Education, with an emphasis on Zoology. The selection of these elements was motivated not only by the social demands generated by the pandemic context but also by the flexibility of digital technologies in educational settings, where they can be applied to remote, hybrid, or face-to-face teaching modalities; by the extension-oriented nature of the project; and by the first author's enthusiasm for animated films. From this integration emerged the WebQuest entitled "Learning Zoology and Taxonomy through Films."

Subsequently, the WebQuest "Learning Zoology and Taxonomy through Films" was validated by specialists and by a Basic Education Science teacher and was implemented in a public school in 2022 within a post-pandemic educational context marked by the resumption of in-person social interactions in educational institutions. However, it is important to note that the present study focuses exclusively on the validation process and on the teacher's perceptions following implementation. This led to the following research question: what are the possibilities of using a Zoology WebQuest associated with media language in Science Education?

In response to this question, the study that gave rise to this article sought, as its general objective, to investigate the possibilities of using a Zoology WebQuest associated with media language in Science Education. More specifically, the study aimed to analyze, together with Science Education specialists, the potential of the WebQuest and to explore, with a Basic Education Science teacher, the educational potential of this approach.

METHODOLOGY

This article was part of a work plan developed within a public university in the state of Bahia, Brazil. The plan aimed to contribute to the broader use of films through active learning methodologies that incorporate digital technologies into Zoology education, in alignment with the extension project's objective of promoting the dissemination of zoological knowledge while fostering the development of an innovative school culture geared toward scientific literacy.

It is important to note that this study was also linked to an institutional research project that received ethical approval from a Research Ethics Committee (REC). Accordingly, only two specialists in Science Education and one Basic Education teacher who agreed to participate by signing an Informed Consent Form (ICF) through an electronic form were included in the study. This precaution was

taken because, as Martins (2004) argues, qualitative research requires special attention to ethical issues due to the close relationship established between the researcher and the participants.

The WebQuest (WQ) underwent validation by both the Basic Education teacher and peer reviewers, with the primary distinction between these stages being the professional profile of the evaluator. The specialists were selected based on their academic qualifications and educational background, with priority given to those holding a doctoral degree in Science Education. For the validation process, assessment tables were developed for the specialists¹ and for the teacher², based on the evaluation criteria and analytical dimensions proposed by Guimarães and Giordan (2011).

The validation instrument developed by Guimarães and Giordan (2011) was designed for the evaluation of Teaching Sequences (TSs) and is characterized as a cyclical process of Design–Implementation–Redesign (DIR), in which validation constitutes part of the implementation phase alongside the use of the instructional material in the classroom. Each stage of this process undergoes evaluation, contributing to the refinement of the Teaching Sequence structure (Guimarães & Giordan, 2011, 2013).

Given that WebQuests and Teaching Sequences share several common features, particularly regarding the structuring and organization of the teaching and learning process, adaptations were made to the evaluation criteria and analytical dimensions included in the Teaching Sequence validation framework proposed by Guimarães and Giordan (2011).

The validation table was therefore organized into six sections for the specialists and seven sections for the teacher: Section 1: WQ structure and organization; Section 2: problematization; Section 3: adequacy of pedagogical elements/concepts; Section 4: content and concepts; Section 5: teaching and assessment; Section 6: the school and the WQ, exclusively for the Basic Education teacher; and Section 7: suggestions and general comments. Each section contained specific analytical dimensions, which are described in greater detail in the Results section.

From Section 1 to Section 6, participants were required to assess the analytical dimensions using a semi-qualitative scale (Guimarães & Giordan, 2011) ranging from 1 to 3, where: 1 = insufficient (selected when the WQ demonstrated little or no relationship with the issues associated with the criterion); 2 = sufficient (when the criteria were met at a basic level); and 3 = more than sufficient (when a strong relationship existed between the evaluation criterion and the proposal presented in the WQ).

Following the completion of the validation stage, aspects requiring improvement were identified based on feedback from the teacher and peer reviewers, constituting a refinement phase of the WQ. Subsequently, a diagnostic questionnaire was developed and administered to the teacher³ in order to collect data regarding her prior knowledge of and experience with WebQuests and the use of films in Basic Education classrooms.

Furthermore, in an effort to understand the potential of the WQ from the teacher's perspective, a second questionnaire was administered to the

participant⁴ following the classroom intervention⁵. The objective was to collect data concerning her experience with the WQ and the use of films in classroom settings within the context of Basic Education. The questionnaires completed by the teacher were analyzed qualitatively.

RESULTS AND DISCUSSION

THE WEBQUEST

The WebQuest (WQ) was developed using Wix.com, an online website creation and editing platform, and can be accessed at: [WebQuest link to be inserted after blind review]. It may be classified as a long-term WebQuest due to its design for one month of schoolwork and because, by the end of the activity, students will have thoroughly analyzed a body of information and transformed it in some way (Dodge, 1995). It is important to emphasize that the validation process enabled the refinement of the material, and the resulting improvements have already been incorporated into the WQ itself, as will be discussed throughout this section.

For its implementation, the class was divided into groups, since WebQuests are inherently collaborative activities and, therefore, the concept of cooperative learning cannot be dissociated from this methodology (Dodge, 1995). Group work broadens the scope of inquiry, as the likelihood of generating different perspectives on various aspects of the same problem is significantly greater than in individual work (Silva, 2008). The material was developed based on the fundamental structure recommended by Dodge (1995) and Bottentuit Junior (2017), following the stages presented in Figure 1.

Accordingly, the stages that comprise the WebQuest presented in this study are described below.

Home Page: Presents the context in which the WebQuest was developed and indicates when it should be implemented.

Introduction: Provides a brief overview of the history of the taxonomy of living organisms up to the present day, highlighting its importance for the natural sciences. It also introduces the concept of Zoology and discusses its relevance to the conservation of animal species.

Task: Presents the activity instructions and invites students to take on the proposed challenge. At this stage, a fictional scenario is created in which students become members of a team of biologists responsible for classifying living organisms and investigating the lifestyles and characteristics of animals featured in major motion pictures. This represents another characteristic feature of WebQuests: they can be enhanced through the inclusion of motivational elements that complement the fundamental inquiry structure by assigning students specific roles, such as scientist, detective, or reporter, among others (Dodge, 1995).

Process: The process was divided into four stages, referred to as challenges. As is characteristic of the WebQuest approach, much of the information required to complete the challenges is available within the tool itself (Dodge, 1995). As a

digital resource, the WQ can be accessed anytime and anywhere, allowing activities to be completed either at home or at school, since the internet transcends the spatial and temporal boundaries of a conventional classroom lesson (Silva, 2008). The challenges were designed to be completed on a weekly basis.

Films: This page contains all the information required to complete the film-related activities, including the film title, synopsis, main characters, animals featured in the story, and the trailer. From this page, users can navigate to additional pages dedicated to each specific film. The animated films included in the WQ were: *The Land Before Time* (1988), *The Lion King* (1994), *A Bug's Life* (1998), *Ice Age* (2002), *Finding Nemo* (2003), *Over the Hedge* (2006), *Rio* (2011), and *Happy Feet Two* (2011).

Assessment: Describes the criteria to be used in evaluating group performance. According to Bottentuit Junior (2017), the assessment stage should make clear to students which aspects of the activity are most valued, both qualitatively and quantitatively, thereby helping them understand where greater effort should be directed. However, in the WebQuest developed for this study, the assessment criteria and their respective weightings were intentionally left to the discretion of the teacher implementing the activity, thus ensuring pedagogical autonomy.

Conclusion: Congratulates students on successfully completing the proposed activity and contributing to their learning of zoological and taxonomic knowledge. Furthermore, as an incentive for students to continue exploring the topic and to extend the experience to other contexts (Dodge, 1995), they are encouraged to visit the social media profile of a biologist who uses popular culture to discuss a variety of topics related to Science and Biology.

Help: This section provides supporting information to assist students in completing the activity challenges. It includes information on material production, taxonomic classification, binomial nomenclature, and the concepts of habitat and ecological niche. This is another characteristic feature of WebQuests, since some or all of the information with which students interact originates from internet-based resources (Dodge, 1995).

For Teachers: In this section, teachers will find recommendations for two scholarly articles addressing the use of WebQuests as instructional materials and the use of films as a pedagogical strategy, as well as detailed film maps for each film included in the activity. These film maps function as guides that identify the school content addressed in individual scenes of the selected films and may be used in Science and/or Biology education.

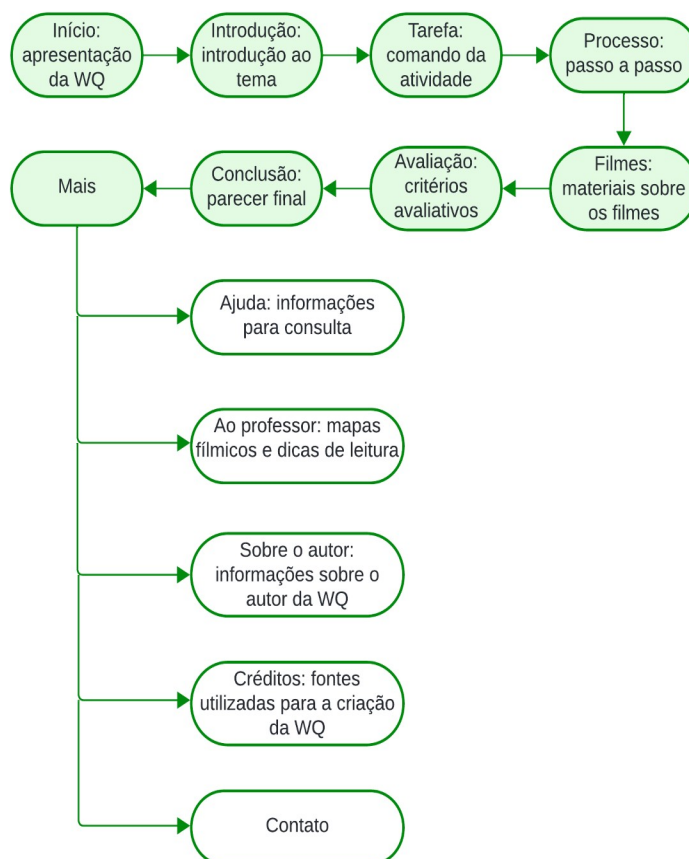
About the Author: Provides a brief introduction to the author of the WebQuest.

Credits: Presents the references used in the development of the WebQuest.

Contact: A dedicated space through which users—including teachers, students, and researchers—may contact the author of the WebQuest to ask questions or provide suggestions and comments.

Figure 1

Structure of the WebQuest



Source: The Authors (2025).

Throughout the WebQuest (WQ), media resources such as videos, images, and hyperlinks were integrated to enrich the learning experience and foster more interactive forms of inquiry. This long-term WQ was designed not only to support teachers in the context of Science Education but also to optimize students' learning time, in accordance with the principle that both short-term and long-term WebQuests are intentionally structured to maximize the efficiency of students' learning processes (Dodge, 1995).

As the volume of resources available on the Web continues to grow, it becomes increasingly feasible to design activities that engage students in active inquiry while making effective use of available instructional time (Dodge, 1995). This development enables educators to plan more dynamic and interactive learning experiences by drawing upon the extensive range of information and digital tools available online. Furthermore, students are afforded opportunities to participate in more autonomous and reflective learning processes, through which they can construct knowledge collaboratively and through investigation.

WEBQUEST VALIDATION

As described in the methodology section, the WebQuest (WQ) was validated through a validation matrix whose sections and analytical dimensions were adapted from Guimarães and Giordan (2011). The instrument was completed by two specialists in Science Education and one Basic Education teacher.

WQ Structure and Organization

This section was subdivided into nine analytical dimensions, and the corresponding results are presented below.

For the dimensions “quality and originality,” “clarity and intelligibility of the proposal,” “textual language,” and “quality of the support material provided to students” (Help section) and its alignment with the proposal, all participants rated the WQ as “more than sufficient.” In other words, according to both the specialists and the teacher, there was a strong correspondence between the evaluation criteria and the proposal presented in the tool.

These dimensions were intended to assess, respectively: (1) the originality of the WQ, including whether similar proposals already exist and the extent of its innovative character; (2) the clarity of the information provided and whether it is sufficient to support understanding of the proposed activities; (3) whether the written language is comprehensible, direct, and appropriate for the target audience; and (4) whether the information made available in the WQ’s “Help” section is consistent with the proposed activity (Guimarães & Giordan, 2011).

Regarding the dimensions “alignment with content” (Zoology and Taxonomy), which assessed whether the WQ was fully compatible with these subject areas considering the seventh-grade Science curriculum, and “media language” (images and videos), which examined the quality of these resources, one of the specialists and the teacher rated both dimensions as “more than sufficient,” whereas the second specialist considered them “sufficient,” indicating that the criteria were met at a basic level.

Based on these results, it can be observed that the WQ is well aligned with the fields of Zoology and Taxonomy, while effectively integrating images and videos. This finding reinforces the use of this active-learning methodology as a pedagogical resource capable of harnessing the educational potential of media, enabling the introduction of a wide range of information about animals that is rarely, if ever, addressed in textbooks (Santos Neto, 2020). Nevertheless, as noted by Costa et al. (2022), digital technology still requires a more dynamic informational language that combines images, non-linear texts in multiple formats, animations, and other digital resources.

With regard to the dimension “connection between the theme and the films used,” which investigated the relationship between Zoology and Taxonomy as represented in the selected films, both specialists rated the item as “sufficient,” whereas the teacher considered it “more than sufficient.” The dimension “integration of films with the proposed activities,” designed to assess whether the films effectively interacted with the task and process components, was rated as

“more than sufficient” by both specialists. In contrast, the teacher evaluated this dimension as “sufficient.”

These findings suggest that the WQ constitutes a technological tool aimed at implementing methodologies that employ cinema as a pedagogical strategy (Rezende et al., 2017), insofar as it draws upon films with social relevance and reinforces the notion of audiovisual media as a highly educational resource (Santos Neto, 2020). From this perspective, the methodology aligns with the argument advanced by Carvalho et al. (2023) that contemporary teaching methods are no longer limited to textbook-based research but increasingly incorporate diverse forms of knowledge acquisition, including internet-based research and the use of films in classroom settings, among other approaches.

The final dimension analyzed in this section was “logical sequence/coherence,” which assessed whether the content and the activity development process were organized in a logical and progressive manner (Guimarães & Giordan, 2011). For this item, one of the specialists and the teacher considered that the criteria had been met at a basic level, rating it as “sufficient.” The other specialist rated the same item as “more than sufficient.” These findings indicate that the WQ followed a logical sequence consistent with both its task structure and the principles of logic and simplicity advocated by Dodge (1995), providing a structured progression of activities and fostering the gradual construction of knowledge by students.

Problematization

In this section, the participants evaluated two analytical dimensions: “alignment of the problem (task) with the theme” and “contextualization of the problem (task).” These dimensions were designed to assess, respectively, whether the problem was closely related to the theme and how the problematization was contextualized in accordance with the reality of the school community (Guimarães & Giordan, 2011).

For both dimensions, one specialist and the teacher considered that there was a strong relationship between the evaluation criteria and the proposal presented in the WQ, rating them as “more than sufficient.” The second specialist, however, rated both dimensions as “sufficient,” indicating that, in her view, the WQ met the criteria at a basic level. These findings suggest that the elements of the WQ, particularly its task, are interconnected and reflect a development process grounded in a problematization framework that is articulated with the various educational aspects that compose learning situations (Guimarães & Giordan, 2011).

Furthermore, a well-designed task, as evidenced by the participants’ evaluations, not only fulfills the essential requirements of the activity but is also capable of fostering students’ creativity in solving the proposed problems. This connection not only guides the learning process but also enables learners to transform the information they gather into knowledge (Dodge, 1995).

Adequacy of Pedagogical Elements/Concepts

The validation of the WQ regarding the adequacy of pedagogical elements/concepts was organized into three dimensions. In two of these dimensions—"diversity of teaching strategies" and "integration of Digital Information and Communication Technologies (DICTs) and the internet into the teaching and learning process"—one specialist rated them as "more than sufficient," whereas the other rated them as "sufficient." For the alternative dimension focused on "cybercultural practices of knowledge construction," both specialists selected the "sufficient" category. The teacher rated all items in this section as "more than sufficient."

The first two dimensions sought to examine whether the instructional strategies incorporated into the WQ were diverse and appropriate for addressing the proposed problem (Guimarães & Giordan, 2011) and whether they contributed to the integration of DICTs and the internet into the system of behavioral interactions between teachers and students, respectively. The results indicated that the WQ satisfactorily met these criteria, aligning with educational approaches adopted in recent years that seek to position students as active agents in the construction of their own learning (García et al., 2020).

These emerging educational strategies make use of digital technologies, which function as valuable allies in the teaching and learning process by making classroom activities—and even those conducted beyond the classroom—more engaging and accessible (Guerra et al., 2022). In this regard, the WQ, as a DICT-based resource, stands out as a promising educational tool because it explores digital technologies and web-based information in a structured and intellectually challenging manner (Ferreira et al., 2022).

Content and concepts

This section sought to assess the adequacy of the WQ based on the typology of the content and its organization, interconnectedness, and diversity. Accordingly, this section was subdivided into six analytical dimensions. Regarding the dimensions of "conceptual content," "attitudinal content," and "organization and interconnection of content" within the WQ, one specialist rated them as "more than sufficient," whereas the other classified them as "sufficient." The teacher, in turn, evaluated all three dimensions as "more than sufficient." For the dimension "procedural content," both specialists and the teacher agreed that there was a strong relationship between the WQ proposal and the dimension under evaluation, placing it within the "more than sufficient" category.

These findings indicate that the WQ was able to integrate content in a logical and progressive manner, ensuring that the proposed conceptual, procedural, and attitudinal contents were interconnected and aligned with both the activity itself and the classroom lessons. This observation highlights a characteristic feature of this type of active-learning methodology: content organization, which facilitates and supports knowledge construction within a guided learning environment through the educational and critical use of the Web (Santos & Barin, 2014).

Classifying learning content according to a specific typology contributes to a more precise identification of educational intentions, since these intentions are reflected in the importance attributed to each type of content. Therefore, it is essential to determine whether the proposed activities and content are appropriate and sufficient to achieve the intended objectives. Furthermore, it is equally important to examine whether the content is organized in a logical and progressive manner, assessing whether there is continuity among lessons or whether they function as isolated events (Guimarães & Giordan, 2011).

With regard to the dimensions “diversity of scientific content/concepts/themes” and “theme, phenomena, and concepts”—the latter intended to evaluate the relevance of addressing the selected theme according to the organizational structure adopted to respond to the proposed problem (Guimarães & Giordan, 2011)—both specialists indicated that the WQ met the evaluation criteria at a basic level. In other words, they classified these dimensions as “sufficient.” The teacher, however, considered that there was a strong relationship between these dimensions and the tool, rating them as “more than sufficient.” These findings suggest that, although there may be room for improvement, the WQ can be regarded as appropriate with respect to the inclusion of diverse scientific content, concepts, and themes, as well as in relation to the treatment of the proposed problem.

Teaching and assessment

This stage was subdivided into four dimensions and sought to analyze the WQ from the perspective of teaching and assessment processes. The dimension “methodological aspects” aimed to evaluate whether the methodological features were appropriate and sufficient to achieve the planned objectives (Guimarães & Giordan, 2011). One specialist and the teacher rated this dimension as “more than sufficient,” whereas the second specialist classified it as “sufficient.”

The same pattern of results reported above was observed for the dimension “contextualization of the proposal/activity.” This dimension examined whether the activity was adequately presented to students and whether it promoted the contextualization of the content to be learned (Guimarães & Giordan, 2011), given that one of the objectives of innovation in pedagogical practices through the incorporation of Digital Information and Communication Technologies (DICTs) into Science Education is the contextualization of content in conjunction with the implementation of active-learning methodologies (Costa, 2021).

The dimension “procedural organization of the activity” was designed to evaluate the “Process” stage of the WQ. In this regard, all participants considered that the tool demonstrated a strong relationship with the criterion under evaluation, classifying it as “more than sufficient.” This strong relationship between procedural organization and the WQ suggests that it provides an appropriate pathway for the development of its stages, thereby reinforcing its effectiveness as a pedagogical tool. This finding corroborates one of the benefits of the WQ for teachers described by Santos and Barin (2014, p. 4), namely, its “[...] capacity to mediate and organize processes and to articulate active learning [...]”.

The final dimension in this section was “assessment criteria/assessment proposal,” which examined whether the suggested assessment requirements were appropriate and sufficient in relation to the proposed objectives and content, given that what is assessed should be directly connected to what is intended to be taught (Guimarães & Giordan, 2011). For this dimension, both specialists considered that the WQ addressed the criteria at a basic level, classifying it as “sufficient.” In contrast, the teacher rated it as “more than sufficient.” In this respect, the WQ offers the advantage of positioning the teacher as a careful evaluator of students’ learning construction (Santos & Barin, 2014), while also making the assessment criteria explicit to students, thereby promoting a transparent evaluation process aligned with the objectives of the activity.

The school and the WQ

For the WQ to be implemented in the school setting, it needed to be analyzed and developed in accordance with the actual needs of the school, since this would be the environment in which it would be implemented and where its potential and challenges could be observed. Accordingly, this section was reserved exclusively for the Basic Education teacher, as she possessed direct knowledge of both the students’ needs and the reality of the school in which the WQ was intended to be implemented. It should be noted that the participating specialists were external to this context and, therefore, were not familiar with the specific characteristics of the school under consideration.

Thus, this section sought to examine the WQ in light of the school’s needs. To this end, it was organized into three dimensions. For the dimensions “adequacy of the time allocated according to the proposed activities and their feasibility in the classroom” and “appropriateness for the target audience (seventh-grade elementary school students),” the teacher indicated that the WQ demonstrated a strong relationship with the evaluated criteria, rating both dimensions as “more than sufficient.”

These findings indicate a high degree of alignment between the WQ and the school’s needs, particularly regarding time management and suitability for the target audience. The time allocated to the activity should be compatible with the number of weekly and total class periods available for Science instruction (Guimarães & Giordan, 2011). WebQuests, in turn, are carefully designed to maximize students’ use of time and, consequently, the effectiveness of classroom instruction (Dodge, 1995).

Regarding the dimension “compatibility between the school infrastructure/students’ context and the proposed activities,” the teacher classified the tool as “sufficient,” indicating that it met the criterion at a basic level. The infrastructure of the school in which the WQ is intended to be implemented, as well as the social context of the student body, must be compatible with the requirements necessary for carrying out its activities (Guimarães & Giordan, 2011). Therefore, the teacher’s positive evaluation confirms that, although the WQ only met the infrastructure and social-context criteria at a basic level, the tool remains feasible and relevant within the school setting.

Suggestions and general comments

The analysis of this section considered the suggestions and comments provided by the participants and, in the specific case of the teacher, her assessment regarding the possibility of using the developed WQ in the classroom.

One of the specialists praised the relevance of the WQ, highlighting its potential for classroom application. As part of Digital Information and Communication Technologies (DICTs), this active-learning methodology can generate opportunities for information sharing and interaction, while also transforming conceptions of teaching, learning, and the classroom environment (Vidal & Miguel, 2020). However, she emphasized the importance of carefully considering the time required to complete the activity, suggesting that students should have the opportunity to become familiar with the selected films, since not all of them may have had prior contact with these works. She also proposed including a stage in which students themselves could suggest films for future implementations, thereby promoting greater engagement and personalization of the activity.

The second specialist, in turn, expressed the need for additional guidance for teachers, noting that although the WQ was primarily designed for students, it would be valuable to provide a detailed guide for the teacher responsible for conducting the activity. In addition, she questioned the grade level for which the activity was intended and suggested incorporating phylogenetic systematics into the content through the use of cladograms. In her view, reinforcing this aspect would contribute to a deeper learning experience.

The recommendation to provide additional guidance for teachers is consistent with the urgent need for teacher-training processes focused on the practical implementation of DICTs in classroom settings. In contemporary society, students are immersed in a digital world, and teachers, as the primary agents of educational development, must likewise be prepared and actively engaged within this environment (Guerra et al., 2022).

Accordingly, given that we now face, among other forms of vulnerability, digital vulnerability, investment in high-quality, continuous, and up-to-date teacher education is essential. Educators are responsible for guiding interactions with students, fostering knowledge expansion, dialogue, and the interpretation of multiple realities (Schuch & Conte, 2022).

The teacher, in contrast, expressed satisfaction with the WQ, evaluating it positively and considering it suitable for classroom implementation. Her principal suggestion was that, in the future, the tool could be adapted to a multidisciplinary context, thereby broadening its scope and promoting integration among different fields of knowledge. WebQuests can indeed encompass a multidisciplinary approach. However, as Dodge (1995, p. 2) states, "Since multidisciplinary approaches present a greater challenge than work within a single subject area, it may be advisable to begin with the latter until sufficient experience has been gained to undertake more comprehensive projects."

Regarding the use of the material in the classroom, the teacher stated that she would use the WQ in her Science classes, justifying her response by emphasizing the tool's potential to promote more effective learning of content that, through

traditional approaches, might not achieve the desired outcomes. According to the teacher, “[...] the WQ introduces new elements into the classroom environment by bringing Web-based resources, something that is of great interest to young people nowadays.”

Thus, the teacher evaluated the WQ as a valid instructional resource for Science Education, capable of engaging students through the integration of digital resources that appeal to young people’s interests and that help overcome some of the limitations associated with traditional teaching approaches. These digital resources are widely embedded in the everyday lives of twenty-first-century students and can create multiple learning opportunities as students explore computer screens and other digital devices, generating moments of interaction that contribute to the development of new competencies and skills (Vidal & Miguel, 2020).

Therefore, considering that the incorporation of digital technology into educational processes represents a departure from traditional teaching methods, the WQ stands out as an innovative and creative tool capable of supporting teachers in the development of engaging learning activities, transforming students into active participants in the construction and enhancement of their own knowledge (Silva, 2008; Vidal & Miguel, 2020).

Teacher perceptions of the WebQuest and the use of films

As detailed in the methodology section, two questionnaires were also administered to the Basic Education teacher – one before and one after the pedagogical intervention – with the aim of exploring her perceptions regarding the use of the WQ and films in the classroom. This section presents the data obtained from these assessments through a qualitative analysis, discussing the teacher’s observations and organizing the responses according to the main themes addressed in the data collection instruments.

In the first questionnaire, the teacher demonstrated familiarity with the methodology, stating that she had previously used it in her Chemistry classes, specifically when teaching the topic of chemical functions. This finding highlights one of the advantages of the WQ: its flexibility to be applied to a wide range of topics and across different fields of knowledge (Rocha, 2007). She reported that, at the time of implementation, the WQ yielded positive results, with active student participation. According to the teacher, these outcomes were associated with the fact that active-learning methodologies differ from what students are typically accustomed to, which is consistent with Silva’s (2008) argument that the WQ supports teachers in designing stimulating activities that engage students as protagonists in the construction of their own knowledge.

When asked whether she would use the WQ again, the teacher responded affirmatively, justifying her decision by describing the tool as “creative and innovative” and emphasizing that students appreciate this type of activity. The teacher therefore views the WQ as a distinctive approach capable of engaging learners and contributing to a more dynamic and participatory learning environment. These responses reveal a positive perception of the use of the WQ

in the teacher's professional practice, both in terms of its implementation and the outcomes achieved with students in previous experiences.

As part of Digital Information and Communication Technologies (DICTs), the WQ represents an alternative approach to learning and can contribute to the development of participatory, innovative, creative, and stimulating learning experiences that support knowledge construction (Silva, 2008; Vidal & Miguel, 2020). Furthermore, as noted by Santos and Barin (2014), it is an innovative educational tool whose development, implementation, and effectiveness reinforce the relevance of contemporary educational practices.

Regarding the use of films in the classroom, the teacher reported having previously employed this resource to teach the topic "Living Organisms." When asked whether she would use films again, she responded affirmatively, arguing that films make lessons "more interesting and dynamic." Reflecting on her previous experience, the teacher described it as "very positive," noting that "[...] the students enjoyed it very much, and learning outcomes were excellent." This statement suggests that she perceived favorable results in both student engagement and learning effectiveness, in line with Rezende et al. (2017) and Santos Neto (2020), who recognize cinema as a highly educational medium for the construction of scientific knowledge, capable of encouraging students to learn and interpret content creatively and effectively.

In the second questionnaire, the teacher described her experience implementing the WQ as "very positive," emphasizing the students' receptiveness. This suggests that the use of this active-learning methodology in the classroom was well received and effectively implemented, resulting in positive student engagement. When asked about the contribution of the WQ to the Science Education process, the teacher stated that she believed the tool had been helpful because students became actively involved in research activities, which facilitated their understanding of the content addressed.

This observation supports the understanding that DICTs promote the diversification and flexibility of learning activities, making teaching more attractive by facilitating access to content and its appropriation through the collaborative construction of learning (Faraum Junior & Cirino, 2020; Carvalho et al., 2023). Furthermore, the inquiry-based approach inherent in WebQuests offers a valuable opportunity to engage students, as it encourages both the search for relevant information and the development of critical and creative thinking skills (Santos & Barin, 2014; Ferreira et al., 2022).

Regarding the possibility of using a WQ again, the teacher was unequivocal in stating that she "certainly" would do so, expressing no hesitation in justifying her willingness to reuse the tool. This response reflects her confidence in the pedagogical benefits of the approach. However, when asked about the challenges encountered during implementation, the teacher identified two main issues: familiarity with digital technologies and a lack of interest among some students. The first challenge concerns students who are still unaccustomed to digital technologies, which may constitute an initial barrier to the effective implementation of the methodology.

This issue reflects a reality highlighted by Silva and Oliveira (2022), who observed that although students are generally familiar with digital technologies,

many lack the specific competencies required to employ them for educational purposes, since a substantial portion of their online experience has been devoted to leisure activities.

Accordingly, DICTs should be incorporated into educational settings, as their application in schools is useful not only for teaching but also for ongoing inquiry and learning, renewing pedagogical methodologies through modern and updated approaches that make education more engaging and meaningful (Vidal & Miguel, 2020). To achieve this goal, investment is required in the development of competencies that promote digital fluency, decision-making capacity, knowledge production, and the ability to use digital technologies creatively and critically (Oliveira, 2016).

In this regard, it is important to recognize that the value of navigating the Web without a clear objective is questionable (Dodge, 1995). Therefore, it is essential to establish concrete purposes when using digital technologies and the internet in educational settings, since the Web contains a vast amount of information that may not be relevant to the intended learning objectives. Without such guidance, students may become easily distracted (Silva & Oliveira, 2022).

The second challenge mentioned by the teacher was the lack of interest demonstrated by some students. This issue may reflect a broader difficulty in maintaining the engagement of certain learners in activities that require more active participation in inquiry-based processes, such as those promoted by the WQ (Dodge, 1995). Even so, the teacher concluded that the overall implementation had been very successful, indicating that these challenges did not compromise the effectiveness of the activity as a whole.

With regard to improving the WQ, the teacher suggested including additional films and modifying the assessment format by proposing more practical alternatives, such as creating an artifact or developing a game, rather than presenting a seminar. However, at no point were students instructed to give seminar presentations; instead, they were encouraged to think of creative ways to present their findings, such as posters, slide presentations, videos, models, mind maps, and similar formats. This observation suggests that when students are given freedom of choice, they tend to select traditional forms of assessment because they are already familiar with them. Consequently, it is the teacher's role to diversify assessment practices and guide the development of student productions, challenging learners to explore new forms of evaluation and expression.

Regarding the use of films as a teaching resource, the teacher reported that her experience with them in the classroom had been "very positive." When asked about the contribution of films to Science Education, she emphasized that, in addition to helping students deepen their understanding of the content, films enabled them to demystify certain misconceptions and correct inaccurate information. This observation suggests that films functioned both as sources of information and as stimuli for reflection, encouraging viewers to question the ideas conveyed and contributing to the development of critical thinking among students (Santos Neto, 2020).

The teacher also expressed her willingness to continue using films in her classes, justifying her choice by describing them as a "dynamic tool." This notion of dynamism reflects the perception that films enrich the teaching experience,

making lessons more engaging and diverse while also providing an effective means of breaking classroom monotony and motivating students to explore new knowledge.

Nevertheless, one of the principal challenges identified in the use of films was the need for students to watch them at home. The teacher considered that the ideal situation would be for the films to be screened at school. Classroom screenings would ensure that all students had equal opportunities to watch and reflect upon the films appropriately. This consideration aligns with the ideas proposed by Oliveira et al. (2016), who argue that the presence of the teacher is essential to provide commentary on the films and to support the development of critical viewers capable of interpreting audiovisual works from multiple perspectives.

For educational institutions to screen films within the school environment, it is essential that they possess the technological resources necessary to implement methodologies that employ cinema for educational purposes (Rezende et al., 2017). Furthermore, the entertainment industry generally operates under the principle that screening a film in a classroom requires prior and explicit authorization from the copyright holder and often involves the payment of exhibition rights, regardless of the educational purpose of the screening (Muriel-Torrado, 2016). Nevertheless, some authors argue that the exhibition of films in educational contexts could be considered part of the constitutional right to education (Muriel-Torrado, 2016).

When asked about the inclusion of films in the WQ, the teacher stated that she considered the way in which the films had been integrated to be “perfect.” This comment reinforces the perception that the combination of the WQ and films, implemented in the manner proposed and without requiring the screening of the films themselves, optimized classroom time and proved effective, thereby expanding the educational possibilities of both resources within the teaching and learning process..

FINAL CONSIDERATIONS

This study examined the use of a WebQuest (WQ) in Zoology education associated with media language, particularly through animated films, within the context of Basic Education. The central issue investigated concerned the possibilities of using this tool in Science Education within a post-pandemic educational landscape that highlighted the need to incorporate Digital Information and Communication Technologies (DICTs) into the teaching and learning process.

The results presented and discussed in this study revealed that the “WQ – Learning Zoology and Taxonomy through Films” received positive evaluations across all analytical dimensions, as indicated by both the specialists and the participating teacher, since it did not receive any “insufficient” ratings on the semi-qualitative scale. Accordingly, the tool proved to be appropriate with regard to its structure and organization, problematization, pedagogical elements/concepts, content and concepts, teaching and assessment processes, and alignment with the school’s needs.

The evaluations also identified aspects that could be further improved, such as the possibility of multidisciplinary adaptation, thereby expanding the integration of the WQ with other areas of knowledge, and the importance of providing a detailed guide for teachers to support the effective use of the tool. In this sense, the WQ is confirmed as an innovative and creative educational resource that makes a meaningful contribution to pedagogical practice by fostering dynamic and engaging learning experiences.

With respect to the teacher's perceptions regarding the use of the WQ and films in the classroom, the responses revealed a favorable perspective toward both the WQ and cinema, encompassing not only the manner in which these two resources were implemented but also the outcomes obtained in both previous and current experiences involving the pedagogical intervention. The teacher emphasized that films and the WQ have contributed, and continue to contribute, positively to Science Education and that the challenges encountered did not compromise the overall success of the activity. Another point worth highlighting is that the combination of the WQ and films, as developed in this study, proved effective in expanding the educational possibilities of both resources within the teaching and learning process.

The pathways pursued throughout this research contribute to the educational field by broadening understanding of the possibilities associated with the use of WebQuests and media language, including filmic and visual content, in Science Education. In addition, the study expands the range of available pedagogical tools and enriches theoretical understanding of these approaches.

It is important to emphasize that the WQ presented here was analyzed based on the perceptions of two specialists and a single Basic Education teacher, whose evaluation was grounded in a specific school context, a particular student population, and prior familiarity with the tool. Consequently, the resource should be implemented in other settings to allow for a broader and more diversified assessment of its possibilities and limitations.

We also recognize the need to expand this study by incorporating additional lines of inquiry that may further strengthen the analyses, since the closed-ended questions employed in the methodological design partially limited the depth of interpretation, particularly regarding intermediate evaluations classified as "sufficient." Therefore, it is hoped that the presentation and discussion of these findings will encourage the development of future studies focused on the creation and implementation of WebQuests that integrate media language into Science Education.

NOTES

1. https://drive.google.com/file/d/1M05ZsZSJqbmSkn6U0DG4kvlDmq1eRxsZ/view?usp=drive_link.
2. https://drive.google.com/file/d/1ITW_6RTvVb2QAq7owiX9zgMDzhr0rYBA/view?usp=sharing.
3. <https://drive.google.com/file/d/1C6a1sBQlcouyZrU0bniegzkFSSenSaZ3/view?usp=sharing>.
4. https://drive.google.com/file/d/18uTbbubDSV5Xo3qO3ao-8oo1MK_9ybom/view?usp=sharing.

5. It should be noted that the intervention involving students was conducted within the framework of the Extension Program “Non-Formal Education at the Zoology Museum of the State University of Feira de Santana: Dissemination and Popularization of Zoological Scientific Knowledge,” affiliated with the Zoology Museum of the State University of Feira de Santana (MZFS/UEFS). However, for the purposes of the present study, the focus was placed exclusively on the teacher’s participation and her perspective on the intervention, since the scope of this article is limited to the validation of the WQ by specialists and by the teacher.

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