VIDEOGAMES WITH EXERGAMES AS A POSSIBILITY OF TEACHER ACTION IN DIGITAL CULTURE[1]

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ABSTRACT

This paper synthesizes an Action Research with the theme of the pedagogical use of exergames in School Physical Education. From the collaboration of a high school teacher, the study identified and discussed the teaching action with exergames in classes. The data generation instruments were field observations and a semi-structured interview with the collaborating teacher. In ATLAS.ti software these data were structured and submitted to a Content Analysis. The experience was signaled as a fertile meeting between the practices of school physical education and digital culture, consolidating a greater student participation in classes and expansion of body experiences. The limitations identified were associated with restrictions on school time and space for body practices and precarious material infrastructure for classes. It was inferred that, allied to the need for continued teacher training, the process of developing digital school culture transcends the presence of technologies and needs to be marked by ethical discussions that favor the formation of citizenship in contemporary culture.

KEYWORDS: Exergames; School physical education; Teaching; Digital culture; ATLAS.ti.

EXERGAMES COMO POSSIBILIDADE DE RESSIGNIFICAÇÃO DA DOCÊNCIA NA CULTURA DIGITAL

RESUMO

A Pesquisa-Ação aqui sintetizada discute a incorporação pedagógica de exergames (EXG) nas aulas de Educação Física Escolar (EFE) de uma escola pública urbana. Contando com a colaboração de um professor do Ensino Médio, o estudo objetivou identificar e discutir ressignificações da ação docente a partir da adoção dos EXG nas aulas. A pesquisa teve como instrumentos de geração de dados observações de campo e uma entrevista semiestruturada com o professor colaborador. Com o auxílio do software ATLAS.ti, esses dados foram estruturados e submetidos a uma Análise de Conteúdo (AC). A experiência foi sinalizada como um encontro fértil entre as práticas da EFE e a cultura digital, consolidando uma participação discente maior nas aulas e uma expansão das vivências corporais na unidade curricular. As limitações identificadas foram associadas às restrições do tempo e espaço escolares para as práticas corporais e à precariedade de infraestrutura material para as aulas. Inferiu-se que, aliado à necessidade de formação continuada do professor, o processo de desenvolvimento da cultura digital escolar transcende a presença de tecnologias e precisa ser balizado por discussões éticas que favoreçam a formação da cidadania na cultura contemporânea.

PALAVRAS-CHAVE: *Exergames; Educação física escolar; Docência; Cultura digital; ATLAS.ti.*

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VIDEOJUEGOS CON EXERGAMES COMO POSIBILIDAD DE FORMACIÓN DE SIGNIFICADOS PARA LA ENSEÑANZA EN LA CULTURA DIGITAL

RESUMEN

La investigación-acción sintetizada aquí analiza el uso pedagógico de los con exergames en las clases de educación física escolar (EFE) de una escuela pública urbana. Contando con la colaboración con un maestro de secundaria, el estudio tuvo como objetivo identificar y discutir los significados de la acción docente a partir de la adopción de exergames en las clases. La investigación tuvo como instrumentos de generación de datos observaciones de campo y una entrevista semiestructurada con el profesor colaborador. Con la ayuda del software ATLAS.ti, estos datos se estructuraron y se enviaron a un análisis de contenido. La experiencia se señaló como un encuentro fértil entre las prácticas de EFE y la cultura digital, consolidando una mayor participación de los estudiantes en las clases y la expansión de las experiencias corporales en el curso. Las limitaciones identificadas se asociaron con las restricciones de tiempo y espacio escolar para las prácticas corporales y la precariedad de la infraestructura material para las clases. Se infirió que, aliado a la necesidad de una formación continua del profesorado, el proceso de desarrollo de la cultura escolar digital trasciende la presencia de tecnologías y debe estar marcado por debates éticos que favorezcan la formación de ciudadanía en la cultura contemporánea.

PALABRAS CLAVE: Exergames; Educación física escolar; Enseñanza; Cultura digital; ATLAS.ti.

1 PRESENTATION

One of our main characteristics of our daily lives is the presence and social appropriation of Digital Information and Communication Technologies (DICT). A continuous dynamic of reconfigurations mediated by these technologies can be seen in the most different branches of human activity, interposing a series of challenges to the productive processes in society. From this scenario of transformations, problematizations emerge that involve ethical, political, labor, economic, environmental, scientific, educational, security and data privacy issues, etc., and which raise the need for a better understanding of the spirit of that time.

Hence, it can be said that the contemporary socio-technical scenario typifies a digital culture[2] (LEMOS, 2020), whose processes of communication, creation, production and movement of merchandise, goods and values are mediated by DICT in network and virtual environments. We situate the development of this culture based on a "[...] technological revolution concentrated on information technologies [which] began to remodel the material base of society at an accelerated pace" (CASTELLS, 1999, p. 39), in view of the scientific-technological advances in the field of electronics, which marked the last five decades of the 20th century.

Specifically, the need to place education and its processes in this context of constant changes results from this sociocultural reconfiguration. Thus, this research involved the introduction of exergames (EXG) in pedagogical practices and sought to systematize resignifications of teaching action based on this experience. The field research work was carried out in an urban public school in the interior of Minas Gerais and had the support of school management, with the voluntary adhesion of a teacher of School Physical Education (EFE) and students from two classes in the 1st year of High School. The good reception of the research/intervention project by the school's professionals and the conditions of guarding/securing equipment were factors that guided the choice of the school as the locus of research.

It is worth mentioning that, in this research, we understand EXG as digital games capable of capturing users' real movements and simulating them in a virtualized environment for the development of actions in games. In other words, differently from traditional digital games - which are often associated with sedentary behaviors (CUSTÓDIO et al., 2019) - the EXG, by converting real body movement to an "[...] virtual environment, [enable] users [...] to practice virtual sports, fitness exercises and/or other physical activities [...]" (MEDEIROS et al., 2017, p. 465).

We assume as hypothesis that the EXG could present themselves as cultural artifacts capable of providing the EFE teacher with opportunities to reconfigure pedagogical strategies in digital culture. Although the experience involved different school subjects, this article is dedicated to the contributions collected from the EFE teacher, which allowed us to advance in the understanding of teaching resignifications associated with the pedagogical incorporation of EXG.

2 MATERIALS, METHOD AND PROCEDURES

Our research purpose, also, considered the need to bring a/the public school closer to the practices of digital culture. Thus, we take the EFE classes as a privileged space to foster reflections about the virtualization of (body) movement in pedagogical practices with EXG.

We register that the research synthesized here used two Xbox One video games with Kinect sensors (Microsoft®) and two 55-inch LED TVs. This equipment was financed by the

Research Support Foundation of Minas Gerais and was essential for the satisfactory development of the actions planned in the study. In parallel with the use of EXGs, the team built/made available adapted materials (bamboo bow and arrow, cardboard target for Target Shooting practice; pet bottles and indoor soccer ball for Bowling) in activities on the school's sports court.

From a methodological point of view, the research followed the qualitative perspective (LÜDKE; ANDRÉ, 1986), consolidated an Action Research (THIOLLENT, 1996), which starts from the principle of collaboration with members of the school community, especially with teachers, *in loco*, and focused on pedagogical practices. In this sense, we consider pedagogical intervention research as: means to achieve changes in attitudes and behaviors in individuals and participating groups; in-service training; and opportunity to review pedagogical practice based on reflective processes. For this, we developed a pedagogical strategy for school intervention in partnership with a school EFE teacher, a scientific initiation scholarship holder, a master's scholarship holder and two supervising professors from the Federal University of São João del-Rei (UFSJ).

2.1 Brief rescue of field intervention planning

The intervention action plan in the school context took place in the second semester of 2018 and comprised eleven 50-minute classes in the following format: Presentation of the team and observation of the groups (two classes); Discussion of the topic "Digital games" (one class); Presentation of the project with the EXG (one class); Practice Bowling mode (two lessons); Practice mode Target Shooting (two lessons); Free experimentation (two classes); and Evaluation and closure (one class).

Classes were planned by the division of the class into eight groups of five students and in such a way that all students could have the opportunity to use the EXG. During a class, at the same time, four groups worked with the EXG and the remaining groups worked on the school's sports court. In the subsequent class, the groups alternated in the spaces with EXG and sports court. Thus, all involved experienced virtualized practices and adapted to the school court in three classes. As an evaluation of the intervention, the students produced a report explaining their perceptions regarding the experience.

The intervention carried out at the school was collective and had the support of the team of researchers along with the teacher throughout the project. We note that the schoolteacher did not assume a secondary role in the implemented configuration, with the emergence of a collaborative dynamic between researchers-teacher in the effective planning together with the students.

2.2 Methodology in action: systematization of empirical data on ATLAS.ti

In addition to the observations and records in field notes elaborated throughout the intervention period, the production of empirical data had as its main generating instrument a semi-structured interview conducted with the teacher of the course unit. This interview was recorded in digital audio and transcribed. This material formed the basis of a Content Analysis (AC) (BARDIN, 2016) structured in the software ATLAS.ti, which helped us in the process of treatment, relationship and inferences of /with the data.

In the software, the AC work started with the floating reading of our empirical data. This procedure, in accordance with what was proposed by Bardin (2016), allowed a moment of immersion in the content and the identification of similar themes in the teacher's interview. Afterwards, we proceeded to an in-depth reading of the material and, in this process, we referenced (indexing/coding) the content using indexes, which in ATLAS.ti are treated as codes. At the end of this stage, the software processed the result of the referencing and calculated its frequency of occurrence in the text (AC indicators), as shown in Figure 1.
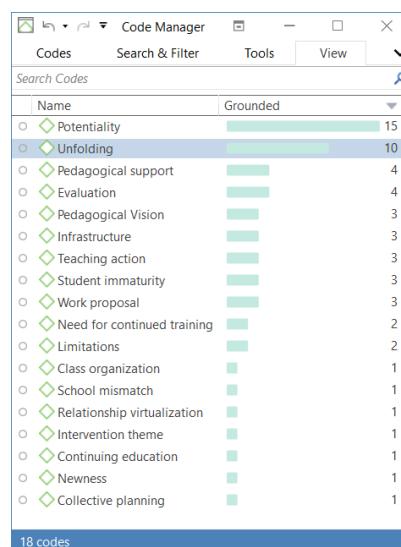

Figure 1 - Result of referencing the empirical data
Source: ATLAS.ti software screenshot.

As it can be seen in Figure 1, 18 indexes (codes) were created, which summarized important information in centers of interest in accordance with the research objective. These indexes and their indicators (Magnitude field - Figure 1) suggested the trend of the analysis. The next step of the analytical procedure comprised the semantic grouping of the codes forming the **empirical categories** of AC (BARDIN, 2016). At ATLAS.ti, these categories are represented by "Code Groups", which, in practice, are families of codes gathered in accordance with their thematic affinity. For the work in question, four empirical categories were systematized according to Table 1.

Table 1 - Empirical categories

Category	Description
Research intervention	Meanings associated with pedagogical intervention
Experience	Meanings associated with EXG experience
Exergames	Meanings associated with EXG
Digital Culture	Meanings associated with digital culture at school

Source: Research planning.

The AC recommends the definition of the **registration units** and context related to the material under study. In this perspective, Franco (2005, p. 37) clarifies that the registration units must be defined considering "[...] the smallest part of the content whose occurrence is registered according to the categories raised". The author also says that the definition of these registration units is typical of each investigation, involving specific defining characteristics. For our study, we chose as a unit of record the "theme" present in the teacher's considerations, which was related to an empirical category. Still, it is necessary to consider that

> the **context unit** must be considered and treated as the basic unit for understanding the encoding of the recording unit and corresponds to the message segment, whose dimensions (greater than those of the recording unit) are excellent for understanding the exact meaning of the recording unit (FRANCO, 2005, p. 44, emphasis added).

As we use ATLAS.ti to proceed with the structuring of the AC, when referencing the content, the indexes created (codes) were associated with excerpts from the teacher's speech. In this way, the analytical process was streamlined, as our record unit (theme) concerns the index created, which is always associated with a textual excerpt (context unit). In Figure 2, it is

possible to see, for example, that the "Unfolding" index is related to a quote from the collaborating teacher's speech (blue color selection in the figure).
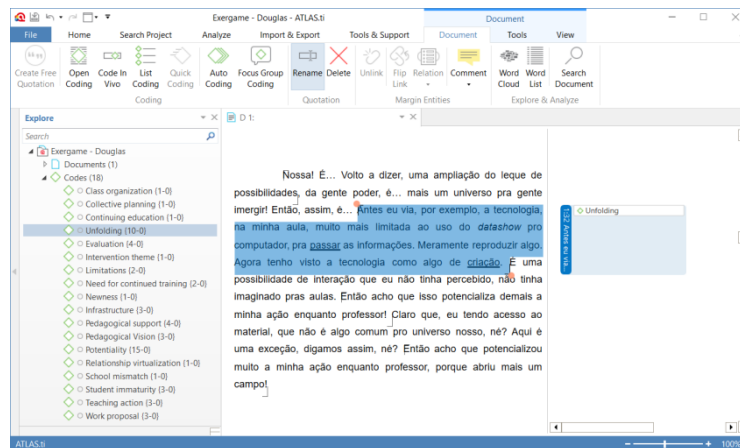

Figure 2 - Content referencing on ATLAS.ti (indexes and context of occurrence)
Source: Screen capture of ATLAS.ti software.

We recall that a registration unit takes on meaning in explaining the context of its occurrence (BARDIN, 2016). Specifically, this is a very useful point for ATLAS.ti, since all references to sections of common significance can be easily gathered and accessed from the indexes (codes). As an example of this functionality, Figure 3 illustrates the 10 occurrences of the "Unfolding" index, which can be easily accessed for analysis and discussion.
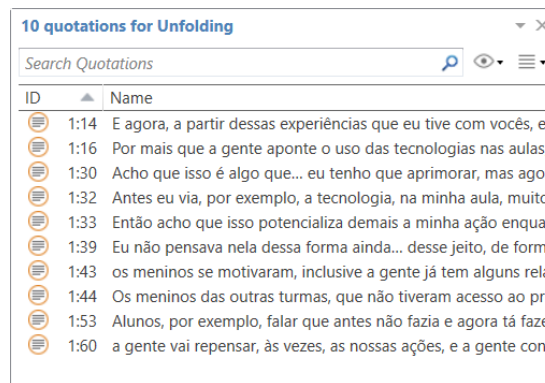

Figure 3 - Occurrences of the "Unfolding" index gathered
Source: screen shot of ATLAS.ti software.

3 RESULTS AND DISCUSSION

Initially, it is important to clarify that the mediation of the ATLAS.ti software is part of a rigorous research planning, which considers the method and the theoretical bases related to the object under investigation. Thus, with regard to AC, we register that the software is not self-sufficient in the construction of indexes, in the referencing process, in the organization of empirical categories, etc. All of these procedures consider the research purposes and are dependent on the actions of the researcher, who structures the data on ATLAS.ti in an oriented way.

Next, we focus on our four empirical categories (Table 1). The subsections contain excerpts from teacher Paulo's[2] speeches – raised through a semi-structured interview – accompanied by an analytical discussion supported by articulations with theoretical references. In order to compose the presentation of the main recurring terms of the teacher's contributions, we adopted the following **representation system**: a) in order to explain the frequency of occurrence of a term in the speech, we use a number in **square brackets**; b) in analytical discussions, to reference a recurring term, we highlight it in **curly brackets**.

3.1 Research intervention

Because it is an investigation that involved an Action-Research, we seek to identify, in Teacher Paulo's contributions, the meanings formed from our work proposal. Initially, considering only the occurrences of the empirical category "Research intervention", we identified the recurring terms in the indexes of this category and had as a result: the pronoun "we" [8]; the verbs "to study" [2], "to abandon" [2] and "to build" [2]; the nouns "exergames" [5] and "court" [3]; and the adjective "interesting" [2].

The terms suggest an intervention: (a) positive {interesting}; (b) that consolidated a collaborative proposal {we/to build}; (c) which involved digital technology {exergames} and traditional EFE spaces {court}; and (d) that encouraged the teacher to discover a new way of acting pedagogically {to study}, but without the need to replace traditional teaching practices {to abandon}. We note that the empirical category "Research intervention" was formed from the indexes present in the network in Figure 4.

Figure 4 - Empirical category "Research intervention" in semantic network format
Source: Research data structured on ATLAS.ti.

In his considerations, teacher Paulo synthesized the proposal of our work as an "[...] idea [...] that we built, collectively [...]" and that encouraged him to have to "[...] do some research [on the topic of digital games...]". This was so that someone could explore "[...] the virtualized culture, the body culture within the exergames" through which it was possible to "[...] try some modalities [sports...] and experience them on the virtual plane" without abandoning "[...] what we used to do before [... that is,] playing sports on the court. We re-elaborated the practice" (TEACHER PAULO).

Based on the speeches of teacher Paulo, we confirm the prerogative of collective/collaborative work, in which the teacher had access to the EXG for pedagogical use with his students (which were organized in groups, as explained in subsection 2.1). In addition to the issues surrounding the availability of EXG for classes, the teacher also had the presence and pedagogical support of the team of researchers throughout the project. In our understanding, this constitutes an incentive for "[...] the development of new learning contexts based on shared social practice, on the collaborative production of knowledge and on reflection on this own practice" (ALMEIDA; PRADO, 2011, p. 14).

In this aspect, we are clear that teacher Paulo's action involved much more than granting time and space for the class to experience the EXG. His field of action was resignified with the proposal, which required research and study on the theme of "digital games" and its use as a way of expressing the body culture of movement (BETTI, 2001). Therefore, it was not a matter of using a technology at any cost, but of promoting reflections, about its pedagogical incorporation in a teaching process, that would encourage revisions in the action field of the teacher.

Finally, resuming the speech of teacher Paulo, we can see that the intervention proposal represented an overlap between the virtualized bodily experience and the one usually explored in the traditional spaces of the EFE (mainly the sports court). In this regard, we understand virtualization as a potentially creative dynamic, that is: a path of conjunction between possibilities of working pedagogically, with no substitution, but coexistence, complementation and updating (LIMA, 2015).

3.2 Experience

The empirical category "experience" integrated teacher Paulo's contributions regarding what was experienced with the introduction of EXG in class. We identified as expressive and recurring terms in the indexes of this category: the nouns "exergames" [7], "experience" [5], "classes" [5] and "students" [4]; and the verb "to motivate" [2].

Starting from these terms, we noticed a perfect harmony with the general research theme, which problematizes the pedagogical incorporation of EXG in a teaching process. Interesting inference occurs in the context of the verb "to motivate", which appears to be associated with a perception of greater interest and participation by students in classes. The empirical category "Experience" was formed from the indexes present in the network represented in Figure 5.
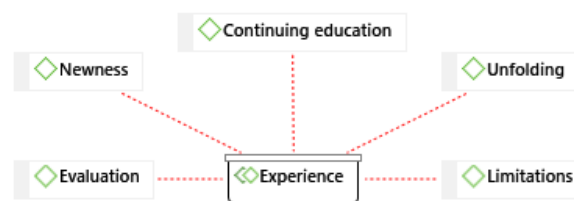

Figure 5 - Empirical category "Experience" in semantic network format
Source: Research data structured on ATLAS.ti.

In his interview, the teacher told us that "[...] I had never worked with [...] the Xbox [...]", but that he had already played at "[...] friends' house, but simply as leisure!" Thereby, the teacher had not thought "[...] to use it in a class!" It is admissible that the experience may have favored the pedagogical incorporation of the EXG into the practices of Paulo, who took the opportunity as a continuing education: "Especially because [the experience] enabled me" (TEACHER PAULO).

The issue involving the "originality" experienced in the experience of incorporating the EXG into the teacher's teaching practices draws attention. This indication put us in front of a paradox: if such a particularity allows a front to build new pedagogical meanings with the EXG, at the same time, it can be considered as an indication of the lack of harmony between educational processes and digital culture. In this perspective, the neglect of this culture as a context of education would be reinforcing "[...] deficient, outdated and disconnected teaching-learning processes from reality" (LIMA, 2012, p. 26).

In a way, the teacher, who indicated that he considered the project as a moment of continuing education, reinforced this panorama. Our intervention experience made reflections and revision of the pedagogical actions feasible: "And now, based on these experiences that I had with you, I am able to outline some strategies so that I can, later, work on other content, or the same content with other classes. [...] Because I didn't have [...] the experience [...] And now I have [...]" (TEACHER PAULO).

This was one of the developments identified with the teacher and that suggests the need to expand the opportunities for discussions involving DICT as elements that integrate with pedagogy, substantiating it. This cannot be achieved without an open mind and the clarity which "[...] we need to create a favorable climate for change, having the courage to break some rules from time to time, showing students and [...] teachers that it is good to risk doing something different "(BARCELOS, 2007, p. 131).

In addition, we identified with the teacher, that the experience undertaken led to a shift associated with the presence and use of DICT in his teaching process: "Before, I saw, for example, technology, in my class, much more limited to the use of the datashow connected to the computer, to pass the information; merely reproduce something. Now, I have seen technology as something of creation" (TEACHER PAULO). This reconfiguration from the teacher's point of view suggests that the intervention made it possible for him to know and take for himself "something new", integrating him into his way of being a teacher and undertaking his teaching process. We believe that this is a crucial movement in a scenario of pedagogical reconfiguration, as changes in behavior and reframing can result from this, potentiating a dynamic of readaptation of customs, values, beliefs and attitudes (LIMA, 2015; LIMA; ANDRADE, 2019).

The experience undertaken also had a favorable impact among students (and the school as a whole). The teacher realized that "[...] the boys were motivated [...]", because "[...] students [...] who previously did not do [Physical Education] are now doing [...]". Besides that "[...] the boys from other classes, who did not have access to the project, asked us to do it. So, it motivated, and it didn't just motivate the class, it motivated the school, it moved the school" (TEACHER PAULO).

In this regard, associated with Paulo's statements, the observations made during the school intervention period suggested that the EXG can be configured as allies of the didactic action of the teachers, promoting greater student involvement. These technologies would be configured in the process as an alternative option to traditional practices, contextualizing them and expanding their possibilities. This should not be seen as a technological determinism in the educational field, since the consequences suggested in the student motivation do not result directly from the presence of EXG in classes. We recall that we undertook a didactically planned integration of the EXG in the teaching process, which had the collaboration and enlightened adherence of the teacher, the school management and the team of researchers. Thus, we advocate that it was the set of these factors that collaborated with the establishment of a productive and favorable environment to the conquest achieved and recognized by Paulo.

Extending this analysis, during the evaluation of the project, Paulo claimed: "[...] I cannot see a negative point in this experience! I can not see!". And, also, he considered the project "[...] very interesting, very positive, [because] it contemplated in a very broad way the objectives that we had [...]". Despite the positive evaluation of the teacher, we registered the perception of experience limitations related to the organization of the school space (which generated disputes in the scheduling of classrooms), in the configuration of the school schedule (50-minute classes) and, not least, in the need for logistical planning that precedes the beginning of classes and continues after its end (preparing the spaces with the EXG, proceeding to the assembly and disassembly). It is worth noting that, due to the collaborative configuration between researchers and teacher, these experience limitations were minimized.

3.3 Exergames

The empirical category "exergames", also, was identified among teacher Paulo's contributions and integrated potentialities and a pedagogical view of this technology. We highlight as expressive and recurring terms in the indexes of this category: the nouns "boys" [9], "environment" [6], "classes" [4], "chance" [4], "experience" [4], "practice" [4], "possibility" [4], "movement" [3] and "resource" [3]; the adjective "virtualized" [6]; and the verb "to experience" [4]..

This synthesis of lexical occurrences allowed us to hypothesize that the EXG, as a pedagogical {resource}, provided {chance/possibility} for the students {boys} {experiment} practices of {movement} in a {virtualized environment} during the {classes}. The empirical category "exergames" integrated the indexes present in the network illustrated in Figure 6.

Figure 6 - Empirical category "exergames" in semantic network format
Source: Research data structured on ATLAS.ti.

Initially, Paulo explained his pedagogical vision regarding the incorporation of the EXG into his practice as "[...] a way to complement what I did before, to expand what I did before [...], it is not going to replace, [...] it will be another tool that I will have to use ". At the beginning of his positioning, when the teacher assumes a "broadening" of his pedagogical practice, a perception of the EXG can be identified, which transcends the transposition of a method or technique from its traditionally worked way to the virtualized format. In this way, the EXG would allow Paulo to "go further" in his pedagogy. On the other hand, at the end of his speech, the EXG's association with "tools" highlights the first moments of an approximation between the teacher and that technology. It would be too early to assume the EXG as socio-cultural objects that are part of the school culture and that, like other DICT, mediate the production and socialization of knowledge.

Even so, keeping in mind the typical reconfigurations of digital culture and the pedagogical planning developed for classes with the EXG, we understand that new ways of teaching and learning can emerge from this imbrication. In time, Paulo repudiated the "logic of

substitution", and this converges with the thought that "the perspective of substitution neglects the analysis of effective social practices and seems blind to the opening of new plans of existence, which are added to the previous devices or complexify them instead of replacing them" (LÉVY, 1999, p. 211).

In addition, we seek to identify in the speeches of teacher Paulo points where the EXG could favor their pedagogical performance. Regarding that first experience with the EXG, the teacher explained a movement of

> [...] expanding the range of possibilities with the boys, to theme the contents, right? For example, we have the chance to offer them a differentiated experimentation of the practice, of the same modality, and some modalities that we cannot experience in the [school] practice… So, I think it is the chance to experiment, mainly, within the body culture, a new format, but mainly new […] modalities [...]. So, I think that [this] greatly enhanced my action as a teacher, because it opened up another field! (TEACHER PAULO)

The excerpt of the teacher's speech contextualizes the enhancement of pedagogical practice with EXG. What was characterized by Paulo as "expanding the range of possibilities" concerns the simulation of atypical sports activities in the school environment with the EXG. Virtual modes of climbing, target shooting and jet skiing, for example, were able to become part of EFE's study themes. Although this perspective - initially – sticks to an efficacy associated with the EXG for the expansion of reference contents, we could observe that the discussions between the students and the teacher were provoked by that "differentiated experimentation". At different times, these reflections involved: digital games as a field of knowledge to be discussed in EFE classes, the contextualization of official rules through the virtualized modality in games and the students' perceptions about muscle fatigue during the practice of virtualized movement and others.

We understand the "new format" indicated by the teacher with a reference to the virtualization of body movement in exergames. We understand that this virtualization is "[...] a fruitful dynamic, potentializing achievements and allowing new forms of creation (LIMA, 2015, p. 42). Moreover, it is worth noting that, when assuming the integration of the EXG into his classes, Paulo not only used "[...] new media to enhance the learning of curricular content, but he contributes pedagogically to the inclusion of this apprentice in the spirit of our sociotechnical time" (SILVA, 2010, p. 38).

Here, we reinforce a new consideration regarding the perception of a greater involvement of students in EFE classes: "[...] there were many people that I thought I could not bring to my classes and with the experiences of exergames I am having the boys in my classes, including the practical classes afterwards! And in classroom lectures too!" (TEACHER PAULO).

This particularity is relevant when we consider that "[...] not all students have the same reasons to participate [in EFE classes], nor the same objectives, [...] but to spend an hour away from the pressure of school work" (FLORENCE, 2000, p. 18). In this configuration, we do not ignore that, as a cultural object, the EXG can constitute allies of the teacher to stimulate student participation in EFE practices, causing the construction of meanings and new configurations of the culture of movement (MENDES; NÓBREGA, 2009) in digital culture.

Finally, it should be noted that we do not advocate a perspective in which the EXGs would be configured "[...] as a kind of candy along with the medicine; and children, quickly, develop the ability to steal the candy while leaving the medicine behind" (BUCKINGHAM, 2010, p. 47). Therefore, it is not a matter of travestying the teaching-learning process with avant-garde artifacts. On the contrary, we defend the construction of an understanding of these digital games as elements capable of substantiating a more intense relationship between digital culture, the EFE curriculum (and, therefore, body culture of movement), school culture, its processes and subjects.

3.4 Digital culture

The empirical category "digital culture" summarized the considerations of our collaborator in what involved our research effort focusing on the approach of the school, its subjects and actions of virtualized practices. This category, intentionally, extrapolated the issue of incorporating the EXG into teaching practices. The most expressive terms in the "digital culture" category were: the pronoun "we" [11]; the adverbs "still" [7] and "far" [3]; the nouns "room" [4], "education" [3] and "material" [3]; and the verbs "to have" [5] and "to achieve" [2].

Considering these occurrences in isolation, we realize that teacher Paulo has integrated/identified with his workspace when using "we" to deal with aspects of digital culture at school. The main idea involved the awareness that school processes and spaces {education,

classroom} are not {yet} integrated into the context of digital culture. {Material} infrastructure issues are configured as the first condition to reduce {achieve/have} the distance {far} between education and the practices of digital culture. However, other elements are part of this panorama and are illustrated in the semantic network of Figure 7.
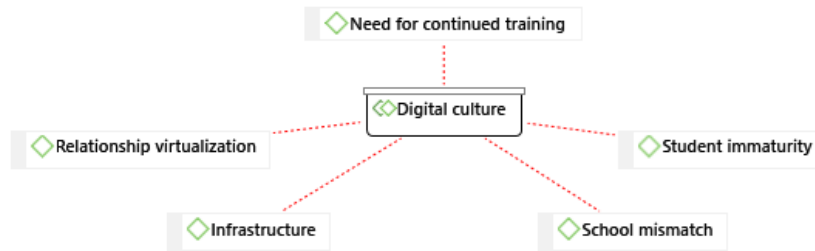
Figure 7 - Empirical category "Digital culture" in semantic network format
Source: Research data structured on ATLAS.ti.

In commenting on the issues surrounding the material infrastructure for EFE classes, Paulo claimed that

> [...] we are still a long way off, within state public education, from being able to have access to these materials [exergames], unless it is through experiences that you have given us the opportunity [intervention and research project]. Because, I am going to talk about other environments in which I have been to, sometimes, not even the traditional material, [... which has a] lower value [...] is admitted [...] as physical education material (TEACHER PAULO).

When positioning, the teacher announces a precariousness involving the materials available for pedagogical action in the Physical Education curricular unit. EXGs are considered to have a remote possibility among the list of options for exploring body practices, considering that even "traditional materials" are difficult to access. We assume this material gap as one of the factors that assert the distance between school and digital culture. Obviously, we are not arguing here that DICT are able to solve all the countless and complex problems that permeate the teaching-learning process. Much less, we intend to

> [...] transform schools into lan houses, because they are different learning spaces and with different logics, but to create a space for teachers to identify, in the interactive discourses of games, ethical, political, ideological, cultural issues etc., that can be explored and discussed with the students, listening and understanding the relationships which the players, our students, establish with these media, questioning, intervening, mediating the construction of new meanings [...]. Or still, learn from these subjects new ways of seeing and understanding these cultural artifacts (ALVES, 2008, p. 8).

In this configuration, our propositions take these technologies as a means of promoting an education more sensitive to the universe of contemporary culture, consolidating the school space as a privileged locus for discussing new languages, the different forms of acting/authorship in the network, the media discourse emanating in cyberspace and the very meaning attributed to digital devices.

When asked - in addition to what the intervention allowed for his curricular unit - about possible practices that would involve the use of cyberspace in the school routine, the teacher stated that there was the use of "[...] social networks, in communion with students, to complement what happens in the classroom"; however, he pondered: [...] there is a lot to enlarge, to expand, right? Steps for us to climb? There are. But I already see an initial path, but it is still far from what society is" (TEACHER PAULO).

The previous excerpts may symbolize an approximation of the practices that take place in the school to the possibilities that integrate cyberspace, in this case, with social networks representing a virtualization of typical classroom relationships. The sense of "complementary" can represent an extension of communication between teachers and students, who now rely on the fluidity of the digital network to opine, to question, to make proposals, to disseminate information and materials, etc. Here, we identify the principle of liberation of network broadcasting (LEMOS; LÉVY, 2010), providing a reconfiguration of time and school communication in an interactive cyberspace, beyond the physical boundaries of the school organization, and enhancing a space for transversal communication between the subjects of education.

Although, at the end of his speech, Paulo assumed the practice as incipient, we are facing a posture that integrates flexibility of time and space to foster learning and that uses motivating, fast, organized, dynamic and typical environments of digital culture. Undeniably, when metaphorizing his initiative as an "initial walk", Paulo, also, admits that he make efforts to meet a demand to bring their practices closer to the typical languages of the information society, showing a chronological mismatch between the school and the inherent reconfigurations of digital culture.

We reiterate that the contemporary scenario shows that DICT assume an important place as mediators of social activities and, therefore, constitute a dimension of culture (PINTO, 2005). Consequently, digital culture brings "[...] with it representations not only in everyday life, but,

also, in terms of forms and possibilities of academic learning" (MORAES; LIMA, 2018, p. 300). In this perspective, we understand that initiatives with DICT at school cannot be configured as isolated and/or episodic attitudes, and it is necessary to evolve to more systemic practices that favor the development of curricular proposals.

For this, it is essential to think about teacher training for the pedagogical incorporation of these DICT. When commenting on difficulties related to teaching in digital culture, Paulo admitted: "[...] there are many things that are very distant for me". In this sense, new orders are imposed on universities as in centers responsible for teacher training. It is essential that these training spaces are sensitive to the demands of digital culture, restructuring the licentiate degree like courses that articulate technical and pedagogical competencies in line with digital culture (LIMA, 2015).

Paulo, also, highlighted the maturity of students as a limiting factor in the formation of digital culture at school:

> [...] let's contextualize the cell phone, in this case, most of the time it is used for distraction. [...] Let us name a clear example: [a student] takes a photo of his colleague in a position, sometimes within a Physical Education activity, in a position of four supports. Based on that, it creates a... it transforms into a meme, it creates a montage and it enhances, negatively [viralizes]. [...] you already lose the student of the practice, because he wants to stay only in that [cell phone] you allowed there. Then, you may have a problem with the family (TEACHER PAULO).

The teacher listed factors that defy teaching in contemporary culture. The teacher does not condemn the use of devices in the school context, but ponders that their use needs to be seen by students in a different way and in a way compatible with the teaching environment. The teacher's considerations summarize the undeniable need to overcome dilemmas and discuss the ethical use of DICT, favoring the formation of citizenship in digital culture.

Pedagogically, we recognize that the underutilization of resources made possible by TIDC is frustrating. When the dialogic potential of the virtualized environment loses territory for the propagation of futility, space is given to imbecility. On the other hand, education has a fundamental role to provoke reflections involving ethical and responsible use of the network and, not least, in the formation of citizens. This is yet another dimension of education in digital culture, in which formal schooling can consolidate itself as an opportunity for informed and intelligent adoption of cyberspace. Certainly, all of this involves discoveries and appropriation

of digital resources, which takes time and requires efforts, but which cannot be silenced in the composition of the curriculum.

4 FINAL CONSIDERATIONS

With this Action-Research, we seek to contribute and substantiate the pedagogical practices of a high school teacher bringing them closer to digital culture. By encouraging the teacher-EXG approach, we seek to identify the resignifications of the collaborating teacher in the study regarding the process of integrating those technologies into their teaching practices. We noticed that our research intervention followed a model of collaborative action, which involved planning and conducting classes in traditional spaces of EFE and with EXG. This arrangement allowed the teacher to try a new way of acting pedagogically, but without the need to replace/extinguish the already consolidated pedagogical practices. Among the perceptions listed in the study, we can highlight: a) greater student motivation for participation in EFE classes; b) expansion of movement practices considering the virtualization provided by EXG; and c) pedagogical integration of the EXG to the teaching process as a way to encourage the resignification of teaching practice in digital culture.

The intervention limiters involved school time and logistics related to the moments that precede and follow the classes realization with the EXG (assembly, configuration, disassembly and storage of equipment). In addition, there was an indication that it is essential to dedicate attention to teacher formation as one of the pillars that support the reconfiguration of teaching in digital culture. Allied to these aspects, the development of this culture in the school was associated with a process that transcends the presence of technologies in the school routine and that needs to be guided by ethical discussions, in order to foster responsible use and that favors citizenship in digital culture..

Finally, we register the knowledge that the actions designed and undertaken in this research constituted a micro-possibility of reflection for changing the pedagogical daily life of teacher Paulo and his students. We have in mind that the developments observed did not result from a technological effect and involved the teacher's open-mindedness and critical capacity, the support of school management to research and the constant and continuous presence of the research team. In this endeavor, we found that the EXG provided relevant interrelationships

with regard to the EFE-digital culture approach and, therefore, these artifacts can be considered valuable means for thinking about the differentiated performance of the teacher in such a context.

RESEARCH FINANCING

REFERENCES

ALMEIDA, Maria Elizabeth Bianconcini; PRADO, Maria Elisabette Britto Prado (Orgs.). **O Computador Portátil na Escola**. São Paulo: Avercamp, 2011.

ALVES, Lynn. Relações entre os Jogos Digitais e Aprendizagem: delineando percurso. **Educação, Formação & Tecnologias**, Lisboa, v. 1, n. 2, p. 3-10, nov. 2008. Disponível em: https://eft.educom.pt/index.php/eft/article/view/58/38. Acesso em: 21 maio 2020.

BARCELOS, Ana Maria Ferreira. Reflexões acerca da mudança de crenças sobre ensino e aprendizagem de línguas. **Revista Brasileira de Linguística Aplicada**, v. 7, n. 2, 2007. Disponível em: https://www.scielo.br/scielo.php?pid=S1984-63982007000200006&script=sci_arttext. Acesso em: 21 maio 2020.

BARDIN, Laurence. **Análise de conteúdo**. São Paulo: Edições 70, 2016.

BETTI, Mauro. Educação física e sociologia: novas e velhas questões no contexto brasileiro. *In*: CARVALHO, Yara Maria de; RUBIO, Kátia. **Educação física e ciências humanas**. São Paulo: Hucitec, 2001. p. 155-169.

BUCKINGHAM, David. Cultura digital, educação midiática e o lugar da escolarização. **Educação & Realidade**, v. 35, n. 3, p. 37-58, 2010. Disponível em: https://seer.ufrgs.br/educacaoerealidade/article/view/13077. Acesso em: 21 maio 2020.

CASTELLS, Manuel. **A sociedade em rede**. São Paulo: Paz e Terra, 1999.

CUSTÓDIO, Iazana Garcia *et al*. Uso de *exergames* em adolescentes: fatores associados e possibilidade de redução do tempo sedentário. **Revista Paulista de Pediatria**, São Paulo, v. 37, n. 4, p. 442-449, dez. 2019. Disponível em: https://tinyurl.com/yakqfbsz. Acesso em: 21 maio 2020.

FLORENCE, Jacques. **Tareas significativas en educación física escolar**. Barcelona: INDE, 2000.

FRANCO, Maria Laura Puglisi Barbosa. **Análise de conteúdo**. Brasília: Liber Livro, 2005.

LEMOS, André. Epistemologia da comunicação, neomaterialismo e cultura digital. **Galáxia**, São Paulo, n. 43, p. 54-66, abr. 2020. Disponível em: http://www.scielo.br/pdf/gal/n43/1982-2553-gal-43-0054.pdf. Acesso em: 9 abr. 2020.

LEMOS, André; LÉVY, Pierre. **O futuro da Internet**: Em direção a uma ciberdemocracia planetária. São Paulo: Paulus, 2010.

LÉVY, Pierre. **Cibercultura**. São Paulo: Editora 34, 1999.

LIMA, Marcio Roberto de. Cibereducação: tensões, reflexões e desafios. **Cadernos da Pedagogia**, v. 5, n. 10, p. 18-29, 2012. Disponível em: http://www.cadernosdapedagogia.ufscar.br/index.php/cp/article/view/215. Acesso em: 21 maio 2020.

LIMA, Marcio Roberto de. **Projeto UCA e Plano CEIBAL como possibilidades de reconfiguração da prática pedagógica com as Tecnologias Digitais de Informação e Comunicação**. Orientadora: Silvania Sousa Nascimento. 2015. 269 f. Tese (Doutorado em Educação) – Universidade Federal de Minas Gerais, Belo Horizonte, 2015.

LIMA, Marcio Roberto de; ANDRADE, Isadora Moreira de. Significado que los docentes le dan a la integración de tecnologías digitales en sus prácticas pedagógicas. **Alteridad: Revista de Educación**, v. 14, n. 1, p. 12-25, 2019. Disponível em: https://alteridad.ups.edu.ec/index.php/alteridad/article/view/1.2019.01. Acesso em: 21 maio 2020.

LÜDKE, Menga; ANDRÉ, Marli Eliza Dalmazo Afonso de. **Pesquisa em educação**: abordagens qualitativas. São Paulo: EPU, 1986.

MEDEIROS, Pâmella de *et al. Exergames* como ferramenta de aquisição e desenvolvimento de habilidades e capacidades motoras: uma revisão sistemática. **Revista Paulista de Pediatria**, v. 35, n. 4, 2017. Disponível em: https://tinyurl.com/yb9fyq6s. Acesso em: 21 maio 2020.

MENDES, Maria Isabel Brandão de Souza; NÓBREGA, Terezinha Petrucia da. Cultura de movimento: Reflexões a partir da relação entre corpo, natureza e cultura. **Revista Pensar a prática**, v. 12, n. 2, p. 1-7, 2009. Disponível em: https://www.revistas.ufg.br/fef/article/view/6135. Acesso em: 21 maio 2020

MORAES, Dirce Aparecida Foletto de; LIMA, Claudia Maria de. O estudante e sua relação com as tecnologias digitais: representações em sua aprendizagem. **Revista Teias**, [*s. l.*], v. 19, n. 53, p. 299–313, 2018. Disponível em: https://doi.org/10.12957/teias.2018.33212. Acesso em: 18 nov. 2020.

PINTO, Álvaro Vieira. **O conceito de tecnologia**. Rio de Janeiro: Contraponto, 2005. v. 2.

SILVA, Marco. Educar na cibercultura: desafios à formação de professores para docência em cursos *online*. **Revista Digital de Tecnologias Cognitivas**, v. 3, n. 3, p. 39-51, 2010. Disponível em: https://tinyurl.com/y8fhyx7g. Acesso em: 21 maio 2020.

THIOLLENT, Michel. **Metodologia da Pesquisa-ação**. São Paulo: Cortez, 1996.

NOTES

[1] This article was translated into English by Lucas Augusto de Carvalho with funding from the Federal University of São João del-Rei, through its Postgraduate Program in Education (PPEDU/UFSJ).

[2] The expansion and consolidation of digital culture presents many challenges in the areas of inclusion, surveillance, security of personal data, modulation of behavior in networks, etc.

[2] In order to preserve the identity of the collaborating teacher in this study, we have fictitiously adopted the name Paulo. Such anonymity is ensured by the Informed Consent Form (TCLE) for participation in the research, which was signed by the teacher.

[3] The body culture of movement comprises activities that involve the exercise of human motricity, such as: sport, popular games, fighting, dancing, gymnastics, etc., which integrate curricular themes of School Physical Education. The expression "body culture of movement" characterizes the specific knowledge of Physical Education and, also, is adopted in the National Common Curricular Base.