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LUDIC REINVENTION IN THE DEVELOPMENT OF GAMES IN HEALTH: THEORETICAL-METHODOLOGICAL FRAMEWORKS FOR THE PRODUCTION OF CRITICAL SUBJECTIVITIES

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ABSTRACT

Objective: to reflect on the centrality of the ludic in the reinvention of critical subjectivities in the area of health; to present, based in the framework elaborated and in the reports of experience in research, the techniques, instruments and triangulations used in the Ludic Reinvention methodology.

Method: theoretical reflection and experience report in research with the aim of basing the theoretical-methodological framework of Ludic Reinvention in the production of game-based educational technologies for health.

Results: the agonist perspective of Ludic Reinvention in the production of critical subjectivities opposes the positivist conceptions present in the scientific and technological production of games geared towards health and the games market.

Conclusion: the methodology of Ludic Reinvention, based in the *agon* as a principle of disputation engaged in favor of the imagination and the abundance of life contributes to experiences which are full of feelings which are expressed in multiple, relational, de-centred and interpretive subjectivities in the players.

DESCRIPTORS: Methodology. Nursing Research. Education, public health professional. Learning. Education, nursing.

RECRIAR-SE LÚDICO NO DESENVOLVIMENTO DE JOGOS NA SAÚDE: REFERÊNCIAS TEÓRICO-METODOLÓGICAS À PRODUÇÃO DE SUBJETIVIDADES CRÍTICAS

RESUMO

Objetivo: refletir sobre a centralidade do lúdico na reinvenção de subjetividades críticas na área da saúde; apresentar, com base no referencial elaborado e nos relatos de experiência em pesquisa, as técnicas, os instrumentos e as triangulações utilizadas na metodologia Recriar-se Lúdico.

Método: reflexão teórica e relato de experiência em pesquisa com o propósito de fundamentar o referencial teórico-metodológico do Recriar-se Lúdico na produção de tecnologias lúdico-educativas para a saúde.

Resultados: a perspectiva agonista do Recriar-se Lúdico na produção de subjetividades críticas contrapõe-se às concepções positivistas presentes na produção científica e tecnológica dos jogos voltados para a saúde e para o mercado dos *games*.

Conclusão: a metodologia do Recriar-se Lúdico, fundamentada no *agon* como um princípio de combate engajado em favor da imaginação e da abundância de vida, contribui para experiências plenas de sentidos que se expressam em subjetividades múltiplas, relacionais, descentradas e interpretativas nas/os jogadoras/es.

DESCRIPTORIOS: Metodologia. Pesquisa em enfermagem. Educação profissional em saúde pública. Aprendizagem. Educação em enfermagem.,

RECREARSE LÚDICO EN EL DESARROLLO DE JUEGOS EN LA SALUD: REFERENCIAS TEÓRICO-METODOLÓGICAS EN LA PRODUCCIÓN DE SUBJETIVIDADES CRÍTICAS

RESUMEN

Objetivo: reflexionar sobre la centralidad del recreo lúdico en la reinención de subjetividades críticas en el área de la salud; con base en el referencial elaborado y en los relatos de experiencia en investigación, las técnicas, los instrumentos y las triangulaciones utilizadas en la metodología del Recrearse Lúdico.

Método: reflexión teórica y relato de experiencia en investigación con el propósito de fundamentar el referencial teórico-metodológico del Recrearse Lúdico en la producción de tecnologías lúdico-educativas para la salud.

Resultados: la perspectiva agonista del Recrearse Lúdico en la producción de subjetividades críticas se contrapone a las concepciones positivistas presentes en la producción científica y tecnológica de los juegos volcados para la salud y para el mercado de los juegos.

Conclusión: la metodología del Recrearse Lúdico, fundamentada en el *agon* como un principio de combate comprometido en favor de la imaginación y de la abundancia de vida, contribuye a experiencias plenas de sentidos que se expresan en subjetividades múltiples, relacionales, descentradas e interpretativas en las/os de las jugadoras/es.

DESCRIPTORES: Metodología. Investigación en enfermería. Educación profesional en salud pública. Aprendizaje. Educación en enfermería.

INTRODUCTION

The significant growth in games produced with educational purposes in health, including the creation of specific areas of production, such as that of what are termed 'serious games', is undeniable. In other fields of development of games stimulated by science, geared more towards the games market, the marked expansion of sales and heating of the economy, in which Brazil is ranked 11th in the market, is clear. This global scenario confers significance and discussion regarding technological production and the study of games, whether for educational purposes or for industrial production, in the national and international ambits – which are intrinsically related.¹⁻⁵

In spite of the richness of the sociological and philosophical concepts regarding the ludic, seen in its disruptive, imaginative and re-inventive dimensions as something inherent to the subjectivities in human cultures, it is not always considered in the production of technological development of games with educational purposes, in particular in areas where technique predominates over human experience, such as in health and in computer engineering. A more attentive look at the concepts of the ludic enshrined in the initiatives of the serious games, or in the technological productions of the electronic games in general, reveals the preponderance of positivist approaches, which restrict the re-inventive possibilities of the play, limiting it to utilitarian instrumentations aimed at the market or at disciplining human action.⁶⁻⁸

The repercussions of the avalanche of production of serious games in health – generally devoid of plural conceptions on the importance of the ludic for the fullness of human life – compromise

the training of critical and reflexive health professionals, a summary of what we have sought to construct through the recent discussions on training in health. As we know, the debate on the reorientation of the training of professionals to be more in line with the Unified Health System (SUS) gains special relevance in the movements for changes in the policies, practices and curriculums of higher education courses in health in Brazil. On this issue, one can observe the significant participation from studies, movements and didactic initiatives originating from undergraduate courses in nursing.⁹⁻¹⁰

In the light of the theoretical-conceptual limitation adopted in producing games in distinct scenarios of learning in health and nursing, which hinders investigations and discursive practices of resistance to the hegemonic positivism of the biomedical model, this article's research question is as follows: why, and how, should one adopt theoretical-methodological frameworks in developing games for health which produce critical subjectivities in the players? We start from the premise that the theoretical-methodological framework of Ludic Reinvention in the development of games for health, in prioritizing the agonist character of play in the production of multiple, relational, de-centered, critical and interpretive subjectivities in the players, supports movements of criticism and resistance to the positivist scientific discourses, broadening the possibilities for the intended changes.

This article's objectives are: to reflect on the centrality of play in the reinvention of critical subjectivities in the area of health; and to present – based in the framework elaborated and in the experience reports in research – the techniques, instruments and triangulations used in the Ludic Reinvention methodology.

METHOD

This is a theoretical reflection article, aiming to substantiate the theoretical-methodological framework of Ludic Reinvention in the production of game-based educational technologies for health. Based in theoretical-philosophical currents, we intend to develop a critical framework which guides the development of games for health and for nursing. In the first topic, we develop the conceptual support for our argument based in books, articles and other productions from authors of post-structuralist currents or who are influenced by Nietzsche philosophy, as critical support for the positivist approaches of production of educational games in health. For the situational analysis of the scientific and technological production of the educational games, were prioritized the results from recent studies or systematic literature reviews, whenever possible, in order to delimit the up-to-dateness of the discussions which influence the area of health and of nursing.

Based on the theoretical framework developed, in the second topic, we describe the stages, methods and techniques concerning the methodology of Ludic Reinvention, based in the experience reports of studies which we undertook and improved in the last seven years, resulting in the production of three games which shape the critical education of health professionals.¹¹⁻¹⁵

Ludic Reinvention in the production of critical subjectivities in health: from the serious games to the transgressing pedagogy of laughter

The ludic element manifests itself through its irreverent, disruptive, imaginative and creative character of the social relations, inherent to human cultures. This means that the principal of *agon* - a Greek term signifying struggle, combat or quarrel - is present in the various ways through which we experience life, whether in the organic processes in the relations of power, or in society in general. The ludic manifestations take place in the various expressions of human coexistence and are not restricted to games *per se*. Or, rather, not only as we know them, but also in the arts, politics, relationships, organizations or even in religion (in the tension between the sacred and profane) there is always a tense and ambiguous conflict which is not always apparent.⁶

Put another way, games, at the same time, transit between the rule and the subversion of the same, between the real and the illusory, between relaxation and apprehension, between spontane-

ity and the disciplining of human actions. These elements both engender and take away images, symbols and interactions regarding the world, which broaden the multiple forms of human understanding. The ludic ambience is characterized, furthermore, by competition, by the participative involvement and by the ambiguity of the emotions experienced, in general steeped in concomitant sensations of pleasure and of pain, which constitute life itself.⁶⁻⁸

The conceptions that value the complexity of games for human life, and which transcend rational instrumentalization regarding ends, are rarely considered in the process of the games' technological production, whether in health or in the games market. Accordingly, it is necessary to look into each one of the approaches which support the scientific and technological production of the games, the better to clarify their premises. We intend, in this way, to deconstruct the discourses and practices which reify the supremacy of technique over the formative character of the ludic.⁸

We shall begin with what are termed 'serious games', indicating their characteristics, applications in health, and limitations for encouraging criticism in education. Following that, we shall move on to the theoretical bases of the scientific production of various areas which support the production and sales of electronic games in these technologies' market. In this second case, the aim is to throw light on the seductive power of the same over the players, to the extent that they sometimes cause health problems arising from psychic dependence, besides the obvious growth in profit for multinational companies.¹⁶

The first person to use the expression 'serious games' was the American researcher Clark Abt, in the 1970s, in a publication focusing on the use of games and simulation in training personnel from different areas, such as the military, industrial, governmental and educational sectors, among others. The classic definition of this modality - which serves as a basis for revisiting this approach in the ambit of electronic games - is as an activity between two or more players who seek to achieve an objective in a limited context. In more recent versions, these are seen as games which distract the players and are used to train or educate, or to change behaviors. Currently, the term covers a wide range of electronic games used in the context of simulation, in widely varying areas.^{1-4,17}

One of the fundamental principles of the use of serious games in education is based in the argument that learning occurs through dynamics of realign-

ment between the environment and the participants, facilitated by simulation techniques. Competitiveness, entertainment and the players' comments are seen as having important investigative potential for assessing the results of the changes in behavior, in particular in health.¹⁷

The main criticisms directed at the use of games in health relate to the fact that they do not seem to be sufficiently serious, and distract the attention of the players. Numerous other investigations have emphasized the need for better control over the clinical effects of adopting games for training patients or professionals in desirable behaviors. In the face of the results, nearly always inconclusive regarding the validity of the efficacy of the use of games in health, the recommendation is for meta-analysis studies with strict control over variables, as in the example of clinical studies.¹

In its serious version, the use of games in the health area is carefully considered for strict educational purposes and is not for fun, although the element of amusement is taken into account, depending on the final purpose. It is not by chance that systematic review studies assessing the results of the use of games in health recommend the same methodological rigor as found in clinical studies, approaching the game as if it were a therapy or pill taken to change behaviors or lifestyles. In this regard, the reviews indicate randomized studies and the control group in investigations for assessing the effects of games on their players. Accordingly, the unforeseen events in experiments with games, typical of the ludic universe, are seen as inconsistencies or shortcomings in the evidence sought.¹

As can be seen, the area of health has rigidly disciplined the seriousness of the game, so that it may be considered as valid evidence for ensuring healthy living habits. Other applications of this theory, however, tend to tone down this alleged estrangement between the game and fun. In approaching serious games in different areas, where the purpose is training, the authors tend to make the fun components of the games compatible with the training, or even take advantage of the fun component of the games in order to mobilize the users' interest, volition and desires. In general, they confirm that a game must be serious, as it deals with issues relevant to the adult universe, but that it can relax the participants, as that facilitates the transmission of information.¹⁷

For developers who are more alert to the signs from the videogame market, the tendency of the serious games is increasingly marked, mainly since

the advent of 3-D technology. More optimistic predictions see, in the potential for immersion induced by the game, an efficacious path for social changes mediated by the 'gamified' learning. In these lines of thought, the future of serious games is heralded based in three aspects: convergent technologies, the expansion in areas where they may be applied, and the evidence of their efficacy. The synergy of these aspects, the specialists say, will guarantee greater acceptance of serious games in the coming five years.¹⁸

In contrast with the seriousness of the serious games, the electronic games market has grasped the strength of the emotions mediated by the ludic in the production of human subjectivities, knowing how to direct these for the commercial interest of profit, which becomes the ultimate purpose of the business. For this, the theories of cognitive and behavioral psychology are used the most in mobilizing the players' interest, emotions and immersion.¹⁹

In the technological areas of electronic games, such as software engineering, interactive design and Human-Computer Interaction (HCI), one can perceive another form of addressing the elements which constitute the ludic. In these areas, instead of walling up the fun of the game in an alleged seriousness demanded by the prerogatives of education, various research techniques have been improved in order to maximize the management of the emotions experienced by the players. As the biggest interest is in producing games, apps and interfaces which are as friendly as possible – as the products' acceptance depends on this – all the stages of game development concentrate on the sensory experience of the users (those who use the computer).²⁰

As a result, the intention is that the human being's interaction with the computer – or with the technique – should be as symbiotic, immersive, and pleasurable as possible. The game, therefore, must be able to produce artificially forged sensations so that people will wish to continue in the game and forget themselves in time, in a feedback cycle of electronic challenges which are infinite and scientifically thought-out with the single purpose of keeping the player in the game.¹⁹⁻²¹

The scientific production focusing on the production and assessment of the experiences of the use of electronic games by users is strongly based in behaviorist psychology – or in its revamped version, positive psychology, whose purpose is to study and manage human behavior for specified ends. One of the lines of thought in this field – flow theory – underlies the production of electronic games which intensify players' emotion in the game. Because of

this approach's centrality in the specialization of production and management of players' feelings of immersion, it is worth taking a keen look at their discursive intentions.²²⁻²⁴

Flow is defined as a complete involvement in what one is doing, associated with pleasant and uplifting feelings. According to the author, flow tends to intensify in activities which involve overcoming challenges which are at the outer limits of our control abilities. Flow relates to that complete immersion and high concentration in carrying out an activity which is generally pleasurable for the person doing it. The optimum point in the flow is where the intersection of the skills with the challenges of a routine experience takes on a balance which is capable of inhibiting the forces of psychic entropy and organizing them, with a positive balance, according to them, for the emotions, which creates happiness for life. This ideal point between exultation, anxiety and concern, on the one hand, and control, relaxation and apathy on the other is held to promote a feeling of general well-being which, it is argued: [...] "causes the excellence of life."^{24:39}

The discovery of flow seeks to respond – through the paths of behavioral science – to the inquiry as to what constitutes a good life. Or, in the scientists' explanation, what would make life peaceful, useful and worthy of being lived. For this, the author adopts three premises. Firstly, he considers that the prophecies, poets and philosophers have glimpsed important truths in the past, but that these are to be found in a dated vocabulary and era – and that they need to be re-discovered by the generations which follow. He is also mistrustful of the immutable truths of what was written in the past. The second premise takes it that science is able to provide "[...] the information which is most essential for humanity^{24:13} and that in spite of all the consequences, at the current time, science remains the only reliable mirror of reality."^{24:13} Finally, the third premise says that we must incorporate the voices from the past into the universe of scientific knowledge.

According to flow theory, to live means experiencing our acts, feelings and thoughts in time. And, as experience occurs temporally, the content of these emotions becomes valuable for determining the quality of life. Based in this, the author has undertaken several studies for quantifying what people do and how they feel in their day-to-day. Based in the measuring of people's activities and transient feelings, the author has arrived at three major blocks of activities: those of production,

those of maintenance, and those of leisure. He also considers nine basic emotions which may be identified through the facial expressions of people from separate cultures (happiness, anger, sadness, fear, interest, shame, guilt, envy and depression) in order to simplify them into two groups: positive and negative. Flow theory promises to increase the quantity of positive emotions and reduce negative ones, as happiness is the "prototype of the positive emotions".^{24:26} Through this, flow theory claims to avoid psychic entropy and to produce psychic negentropy which is a constituent of a coherent self.

Both approaches, whether of the serious games or of flow theory, which are mutually connected, profoundly inhibit the development of reflexive criticism in people, as they dull the irrev-erent feelings of the playful experience. For this to become more clear, we shall move on to deconstruct the conceptions and premises of both approaches described in the above paragraphs, in contrast with our central argument.

As has been seen, the conception of serious games is to direct the games towards the end of producing transformations in people's lifestyles, so that the same may acquire healthier habits or assimilate some content related to education in health. These prerogatives are based in evidence which legitimates the biomedical scientific discourse, which is hegemonic in the scientific productions which support the health professions. In this context, the game – besides being serious – must become a pedagogical tool (such as a multimedia projector, a whiteboard, a flipchart or any other didactic resource) and must be rigidly controlled through randomized studies, so that it may be able to produce the foreseen effect, that is, the change in living habits aimed for. The same premise is repeated in the case of the use of games in training health professionals, in which the intended effect is the top-down absorption of content.^{1-3,17}

That said, the vision of education enshrined in the majority of productions of serious games is restricted and traditional, which inviabilizes critical thinking as it limits human experiences to the norms of the training institutions. The learning may be reduced to the transmission of knowledge and to the disciplining of bodies for the production of behaviors held as ideal for what is considered good health in the view of the specialists. Thus, based on an authoritarian vertical discourse between the person who supposedly knows best – the professor-scientist – and the person who knows less – student or lay patient – the content is passed on at the cost

of the experiences and knowledges of the others, with harm to the ability for abstract and authorial reflection, mediated through the act of thinking.²⁵

It follows that, in the linear view of education which is restricted to the managerial commands related to how the other must live in order to be healthier, a game must be serious, in order to avoid distractions, diversions and transgressions against the rules on the part of those doing the educating. Supposedly, this seriousness will also ensure a better control over the effects of the educational tool on human learning, subsumed as a mere object of experimentation in the ambit of positivist scientific knowledge, grounded in relations of cause and effect. Through this experimental coldness, the power and the up-to-dateness of the scientific evidence are superimposed as a dominant value of truth, with little space left over for questions grounded in other ways of understanding reality. This means that the alleged neutrality and scientific objectivity, with their obsession with evidence as the expression of truth, are superimposed as unquestionable values, as if they were autonomous entities, immune to any negativity regarding their validations – and not as a form of knowledge produced by fallible beings immersed in conflictual volitions of power.²⁶

This scientism is also present in the technological production of games, established in areas which take refuge in behavioral psychology, such as flow theory. In this case, the strategies used are far more seductive and involving, because their power is camouflaged in a magical universe of fun and entertainment, produced by the cultural industry in the information era. Thus, instead of cloistering the emotionally charged characteristics of play for educational ends, as the serious games do, these approaches follow the opposite direction. They explore and manipulate to the maximum certain central characteristics of the ludic, such as the component of immersion which captures the attention of the players in the game, emptying them of meaning as it limits them to the domain of the technique and the consumption of the games.^{11,26-27}

As already noted, human emotions and desires are central elements in the ludic experience, that is to say, they assert the imaginative character of the flight from the immediate reality, which is inherent to the universe of games. The problem is that in mass-producing these characteristics in the ambit of the technology for utilitarian consumption, guaranteed artificially through the technique, there is a preponderance of calculating instrumental reason over the capacity for abstract thought and

human sensitivities. As a result of this, obstacles are raised to any human experience as a unique and pedagogical happening, capable of producing learning which constitutes the inventive, spontaneous, reflexive, creative and critical subjectivities in the participants, besides the mere information mediated by the technology.²⁶⁻²⁷

Although it moves in the opposite direction to the serious games, in relation to the emotions of play, the positivist scientism of the games engineering continues to be restricted to the domain of the conjugation of science with technique on human life. In looking into the premises and promises of flow theory, we see that three pillars which support it do nothing more than reinforce the progressive positive philosophy. In this line of thought, human knowledge should abandon the dimensions of the mythic, magical, religious and philosophical and be directed overwhelmingly to mastering science, conceived as the illuminating summit of reason. In this envisioning of the progress of the human spirit towards enlightenment, all other forms of knowledge of reality are subsumed under the auspices and rigor of science, seen as superior knowledge.²⁸

Attuned with the premises of positive philosophy, which sustain positive psychology, the theory of flow judges its unwavering faith in science to be the only form of thinking and mirror of reality, in spite of criticizing the supposed absolute truths of prophecies, religions and philosophy. This reified discourse of science appears in excerpts emphasized above, that is, when the author asserts that science is capable of providing information which “[...] is most essential for humanity”; or that, “[...] in spite of all the consequences, at the current time, science remains the only reliable mirror to reality.”^{24:13} In taking science to be the only mirror of reality, the author asserts the absolutism of the truth which he initially criticized, falling into a performative contradiction of the most elementary type, inviabilizing the basis of his theory and causing it to collapse on its own.

The limitations, repercussions and consequences of this authoritarian form of conceptualizing understanding reality have been largely studied since the 19th century, on the heels of Nietzschean philosophy and its influence on poststructuralist theories. Although it is not this within this article’s aims to re-visit this discussion, it is appropriate to bring up one of the main consequences of this excessive technification of social life limited to the domain of the objectivity of scientific knowledge. We emphasize the impoverishment of experience in modernity which, entangled in the reproductivism

of technique and of the destructive innovation of science, is short on time dedicated to the happening as it occurs uniquely for each one, as a possibility for sensitive, critical and creative reinvention of the world by people, expanding the power of life for them.^{11,26-31}

In the instrumental context of the reasoning which feeds scientific objectivity, the multiplicity of knowledges and human experiences is seen as an undesirable variable to be controlled, isolated or immobilized. The way of doing this is to transform the experience into an experiment – which, in other words, means confining the imaginative kingdom to the aseptic scope of controlled observation. This characteristic is identified in both the approaches studied, that of serious games and that of flow theory, with specific characteristics in terms of empirical management of the human feelings. In the case of flow theory, the parsimonious character of the experiment summarizes human beings' emotional experiences in nine universal modalities, which – simplified – can be positive or negative. In the behavioral algorithm of flow, the formula for arriving in happiness is simple: it is enough to increase pleasurable feelings, and minimize pain.²²⁻²⁴

The maximum of happiness as the prototype of positive emotions, through the induction of psychic negentropy to arrive at a coherent self, is the depiction of modern-day hedonistic society. In this, the calculation of the utilitarian ethics, associated with the miracles of science, promises to frighten away our afflictions, through artificially producing desires within the sphere of consumption, which do nothing more than extend false needs, and accelerate the circulation of merchandise. This formula is increasingly fragmenting and emptying our existence, instead of ensuring the happiness anticipated through the ideal flow of psychic energy. The problem of the solutions mediated by technological stimuli in order to remain in a numbed torpor is that our pains do not disappear easily, needing increasingly constant stimuli. As a result, the solutions of behavioral psychology and of biomedical technology increasingly deepen the absence of feeling from human experiences, through subsuming them to the universe of technique as an end in itself.^{22,29-31}

In the frenetic pace required to achieve happiness and remain there at any price, we constitute a tired society, exhausted by a psycho-politics in which we become our own tormentors and victims. According to Han, a philosopher of contemporaneity, in tired societies there is an excess of positivity and a suppression of Hegelian negativity, which, as

is known, is essential for the movement of dialectic criticism which integrates the strange to the phenomenal world, instead of excluding it as undesirable. In other words, in nullifying criticism, moved by the *agon*, one joins politics, action and discourse as dynamic producers of the public sphere, and – with them – the major questions for conquering active citizenship. What is left for us is a private, artificially happy, fragmented, vain and increasingly fragile world – because with this we have become accustomed to dealing with, diving in and giving new meanings for our pains.²⁹⁻³⁴

The experience which needs to be reinvented in order to recover meaning for our lives is precisely that which was left out of the experiment of positivist science, because it refuses the tedious and imprisoning repetition of a restricted real which fits in the scientific method. As Larossa says, this is experience seen as a singularity, as a happening, as what happens to us (and not regarding what happens), as that which permeates us and re-creates us. We must not confuse this experience with its banalization in the information society, in which the virtualized acceleration of opinionated merchandise creating fragmented needs and lifestyles based in happiness through consumption. It is necessary to separate the experience of excessive information and opinion which inviabilize it. Neither may we confuse it with the experience of work, because this robs us of the time which we need to experience ourselves.²⁹

To experience, in the ludic sense which is of interest to us here, is to open oneself to that which is not repeated, to what is strange to us, and what exasperates us, to the same extent that it completes us and repletes us with what is new. This experience needs – above all – time in order to be revealed, time for us to let ourselves be overwhelmed by it, time to involve us, engage us, to make us dwell in the entropic combats of our psychic energy, so that new meanings and directions will be possible for life. This more intense meaning of the experience requires one to go into the affections and their ambiguous tension between pain and pleasure in greater depth, it requires one to let oneself be imprisoned ambiguously by that which enslaves us and that which frees us. This conception leads us to live our days more profoundly, to get drunk on the principle of the *agon*, the conflict and the exuberance which affirm the fullness of life – instead of contenting ourselves with the tedious anesthesia which dulls and impoverishes our affections.²⁹⁻³¹

This feeling of the experience which is exteriorized, which allows itself to be permeated by the

chance, by the uncertainty, by the rebelliousness and by the unpredictability of the new, both feeds on and feeds the ludicity. Ludic Reinvention, as a constituent element of multiple, antagonistic, various and uncapturable subjectivities, tends to resist being cloistered, but we cannot guarantee this, due to probity to the criticism which we presuppose. Betting on the inventive character of the ludic experimentation as a possibility for constituting critical subjectivities means conceptualizing the person as a de-centered, diverse, plural person, averse to any rigidly fixed identity, ready to intensify the struggle as an inherent characteristic of life. In order to remain active, combat neither eliminates nor destroys its opposite, but maintains it as an adversary at the same level. An adversary is not an enemy to destroy, but a partner engaged in the maintenance of the play of strengths, wishes and desires which reinvigorate life, for which we struggle together.²⁹⁻³⁵

The daring of the methodology of Ludic Reinvention, in the ambit of the development of games for health, is to give back the ironic, performative and irreverent rebelliousness of laughter as a critical and creative pedagogy, capable of producing new meanings for human experience. This is not the shameful and timid laughter permitted by gaps in serious games. Neither would this be a torpid and inert smile, on the edge of the serious, and drunken from entertainment, induced by a positivized and plastic psychic flow. No, this sad laughter calls us to remain in the scope of the experimental evidence that, as we have seen, impedes the richness, the splendour and the creative strength of our experiences.³⁶

Here, once more, we are supported in the profane pedagogy of Larrosa, in his elogy to laughter, as part of serious thinking, so that he may increasingly play with the words and interpretations about the world, so that life may overflow. The laughter that we would like to return to the production of games for health is that which polemicalizes with the serious, dialogues with it, deterritorializes and exposes its language, denouncing its gaps. A laugh which promotes self-irony, that relaxes rigidly fixed subjectivities, that opens space for unforeseen events, for the unprecedented, for the imagined and, for this very reason, the possible. A reinvigorated laughter, which guffaws and makes us believe that life, even in its worst sufferings, needs to be affirmed with neither additions nor subtractions, so that our experiences may gain new meanings, even if these are not always happy ones.²⁹⁻³⁶

For intellectual coherence, the laughter that we defend for Ludic Reinvention - a methodology of games development which criticizes modern science, but remains within it through the theoretical currents of resistance to positivism - is also performative and open to criticism, so that it may be reinvigorated in the clash of perspectives.

Possible reports for Ludic Reinvention: concepts, playability and ludicity in game development

The methodology of Ludic Reinvention acknowledges the centrality of the inventive and imaginative components, which forge interpretive subjectivities in the players, promoted through the experiencing of games in health. Through this, we invert the values of the usual questions in this type of production, as our interest is much more to adapt, through the crafting and disruptive elements of the ludic, the processes of formative reflection in the participants, rather than disciplining them for content-related purposes.

The mixed methods, understood as the combination of quantitative and qualitative approaches undertaken with the purpose of broadening, deepening and multiplying the ways of interpreting reality, seem to us to be most suited to the theoretical intentions of Ludic Reinvention. This is because its theoretical framework is in philosophical pragmatism, which prioritizes the articulation of thought and action in order to produce the meanings of an intellectual concept. This approach is consonant with openness to the multiple meanings intended by the ludic experience.³⁷

Three stages of Ludic Reinvention complement each other in the production of games for health, namely: a) the theoretical concept of the game and of the rules; b) the refining and evaluation of the playability; and c) validation of the content of the cards and of the construct/criteria of the playability. In the ambit of the classification of the mixed methods, this type of investigation is classified as sequential-exploratory, as firstly, the qualitative aspects of the object are explored, so that subsequently it will be possible to undertake the quantitative validation of the game's ludicity. As a result, one works in the constructivist theoretical perspective during the first qualitative phase of the study in order, later, to validate them quantitatively. As they progress in the stages of research, the methods and techniques are triangulated for the analyses and systematization of the data.³⁷

The theoretical conception of the game and of the rules

The first stage in the development of the game consists in the identification of perspectives for learnings which could be optimized by the reinventive components of the ludic, so that they do not repress the characteristics of either. This without doubt is a crucial phase, which requires attention so as not to banalize either the profundity of the critical concepts of the education, or the liberating components of the game. As has been seen, Ludic Reinvention presupposes the indissociability between education and ludicity geared towards the intensity of the happening of human experiences. Two elements, therefore, need to articulate well: the theoretical conception of the reflexive issues which come to dialogue with the ludic; the game of inspiration to investigate. For both topics, we recommend a careful exploratory study, valuing the relevance of this dialogue.

Regarding the theoretical conception of the topics for the game, broad, interdisciplinary and critical literature reviews are indicated, preferably involving the elaboration of good documentation which forms a basis for the definitions of concepts and of the themes to be addressed in the game. Here, critical depth and contraposition to the positivist currents are fundamental, as the techniques to be adopted in developing the games principally arise from the areas of design, HCI, and software engineering, criticized above. As a result, in order to accentuate the meanings in favor of criticality, it is necessary to change the theoretical perspectives, as a way of opposing the imprisonment of the ludic. We believe that a theoretical support based in currents opposing positivism will be able to invert the discourses to be produced in the game, even if techniques are used from similar studies which, after all, are only means to an end.¹¹

As a way of giving greater consistency to the concepts and issues to be addressed in the game, we recommend the use of techniques of content validation, such as workshops with specialists with some degree of intra-evaluative reliability. This can be done in this stage, while the game is still embryonic, or in the following stages, with the validation of the cards as well.

Regarding the game which provides the inspiration, it is appropriate to select a product which already exists on the market, based on which the new game will be constructed. This second point presupposes an approximation and openness to the universe of games, so the selection will be as genuine as possible. Here, the interest and ludic

experience of the research team are fundamental, not only in this phase, but in the subsequent ones as well. If the researchers have neither had, or do not have, good experiences with the games – or do not open up sufficiently to the participation of the members of the team who had or have pleasurable relations with the same – this choice will become protocol, objective and distanced, contrasting with the theoretical premises of Ludic Reinvention.

In other words, in creating a game, the ludic itself is imposed as a challenge, in its very process of production, revitalizing the team's active involvement in the creation. In contrast with experimental studies, in which the researcher's distancing is required, in the methodologies of game development, the broader, more dialogic and more participative the team's debates are, in the process of formulation, and the richer they are in disputes over perspectives, the greater the chance the team will have of arriving at a creative product. This is to say that the game begins among the people involved in the study, advancing to the final product.²⁰⁻²¹

Once the theoretical framework to be addressed in the game has been elaborated, and the game providing the inspiration has been defined, one can move on to the elaboration of the rules and the construction of a prototype of the game, based in the heuristics of playability, in accordance with the literature. The prototype is an initial model, made of art materials for the internal tests run by the team itself. With each test undertaken, the changes identified, in the matches, for the gradual improvement of the game are put into effect.^{12,20}

Refining and evaluation of the playability

Once the rules have been defined and their dynamics have been carefully adjusted, the game will need to be playable, like any other. This phase consists of the refining of the game's dynamics and the assessment of its playability. Assessing playability consists of knowing if the game is dynamic, interactive, imaginative, reproducible, with an end and with game duration which is sufficient to maintain the players' interest. In this phase, the game's design is improved along with its playability, the game design also being an evaluation object. Tests are run with specific groups, in the form of games with different publics considered for the game, with the aim of perfecting the components and dynamic of the same. The choice of this type of test is justified by broadening the scope and profile of the people who can participate in the game, which is necessary in order to extend the spontaneity of the ludic.

In the final play sessions with the specific groups, in which the game has been elaborated to a greater degree, we adopt tests of usability, monitored using video cameras, in which the players are invited to play alone, without interference from the team of observers, who watch the transmission of the games in a separate room. This procedure, originating from studies on the production of software engineering, aims to make the technologies as intuitive and user-friendly as possible. The procedure is fundamental for evaluating the understanding of the rules and the players' involvement in the dynamics of the game, without the research team needing to explain these for the game to stand out. The number of play sessions for the specific tests will depend on the extent to which the game is playable. In our experience, we undertook between six and ten sessions, but the number of participants is relative. The data collection instruments used in this stage are the observation script and free discussion with the players after the games.¹²⁻¹³

Content validation of the cards and of the construct/criteria of the ludicity

In this phase, the game needs to be completely conceptualized and playable. From this point onward, we undertake tests with a view to two types of technological validation: I) of the content of the cards in relation to a specified theoretical concept (if this is not been done in the first phase) and II) of the criteria and the construct in relation to the ludicity of the game. The sequence for the validation of the game is: validation of the content of the game's cards regarding one or more concepts; pilot-tests of the validation of the ludicity for final adjustments; and validation of the construct and ludicity criteria of the game.

In the validation of the content of the game's cards regarding the theoretical constructs elaborated, tests are undertaken with groups, and consultations and workshops with specialists who will evaluate the game and, in particular, the cards, in line with the recommendation for the technique of content validation. Following that, a pilot-test is undertaken for validating the ludicity and the last alterations to the game are made, with a view to preparing it for the final stage. The number of participants in this phase is calculated based on the sample in the construct or criteria validation phase, which is undertaken next, with 10 to 20% of the sample of the same. The data are analyzed through descriptive and inferential statistics, in line with the statistical plan foreseen for the future validation phase.

Finally, in the phase of validation of construct and criteria of ludicity, the final tests for perfecting and validating the game with the target-public are undertaken. As the instrument validated has 53 items, a minimum sample of 265 subjects – which may be adjusted – is envisaged. Following that, the multivariate inferential analysis of the data is undertaken, using the technique of factorial analysis. Factorial analysis is a statistical technique used for identifying underlying factors which may explain the relations in a set of variables, as was intended in this study. The F-ANOVA test tests the effect of the set of the variables referent to the underlying factors.¹⁴

CONCLUSION

The restrictions of the serious games and of the theory of flow which supports the scientific and technological productions of games resemble each other in three crucial points, which form part of our criticism because of these approaches' inviability in the formation of critical subjectivities. These are: a) in these, the meaning of people's experience is emptied of meaning and subsumed to a mere experiment in the positive sciences; b) as a result of this, an alleged axiological neutrality of the scientific discourse is produced, covered by the unquestionable power of the empirical evidence, which reifies crystallized positions of dominion, which are both immune to and inviabilize criticism; and c) this done, the liberating characteristics of the ludic are inviabilized in both approaches, either because they trivialize fun in favor of disciplining learning, or because they empty the meaning from the *agon* in artificial feelings of emotions, limited to the power of the technique. In contrast with these approaches, we argue for a Ludic Reinvention grounded in the *agon*, understood as a principle of struggle engaged in favor of the recreation and abundance of life, which produces experiences which are full of meaning, forged in multiple, relational, de-centered and interpretive subjectivities between the players.

REFERENCES

1. Kato PM. Evaluating Efficacy and Validating Games for Health. *Games for Health J* [Internet]. 2012 Feb [cited 2017 Mar 22]; 1(1):74-6. Available from: <https://doi.org/10.1089/g4h.2012.1017>
2. Wang R, De Maria S Jr, Goldberg A, Katz D. A systematic review of serious games in training health care professionals. *Simul Healthc* [Internet]. 2016 Feb [cited 2017 Mar 22]; 11(1):41-51. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/26536340>

3. Abdulmajed H, Park YS, Tekian A. Assessment of educational games for health professions: a systematic review of trends and outcomes. *Med Teach* [Internet]. 2015 Apr [cited 2017 Mar 22]; 37(Suppl 1): S27-32. Available from: <http://www.tandfonline.com/doi/full/10.3109/0142159X.2015.1006609>
4. Bontchev B. Adaptation in affective video games: a literature review. *Cybernetics Information Technol* [Internet]. 2016 Sep [cited 2017 Mar 22]; 16(3):3-34. Available from: <https://www.degruyter.com/view/j/cait.2016.16.issue-3/cait-2016-0032/cait-2016-0032.xml>
5. A indústria de jogos eletrônicos, um setor em ascensão no Brasil e-commercebrasil [Internet]. e-commercebrasil; 2016 Ago 15 [cited 2017 Mar 22]. Available from: <https://www.ecommercebrasil.com.br/noticias/industria-de-jogos-eletronicos-um-setor-em-ascensao-no-brasil>
6. Gadamer HG. *A atualidade do belo: a arte como jogo, símbolo e festa*. Rio de Janeiro (RJ): Tempo Brasileiro; 1985.
7. Huizinga J. *Homo Ludens: o jogo como elemento da cultura*. São Paulo (SP): Perspectiva; 2008.
8. Caillois R. *Os jogos e os homens: a máscara e a vertigem*. Lisboa (PT): Cotovia; 1990.
9. Dias HS, Lima LD, Teixeira M. A trajetória da política nacional de reorientação da formação profissional em saúde no SUS. *Ciênc Saúde Coletiva* [Internet]. 2013 jun [cited 2017 Mar 30]; 18(6):1613-24. Available from: <http://dx.doi.org/10.1590/S1413-81232013000600013>.
10. Soares, AN, Gazzinelli, MF, Souza, V, Araujo, LHL. The Role Playing Game (RPG) as a pedagogical strategy in the training of the nurse: an experience report on the creation of a game. *Texto Contexto Enferm* [Internet]. 2015 [cited 2017 Mar 30]; 24(2):600-8. Available from: <http://dx.doi.org/10.1590/0104-07072015001072014>
11. Pires MRGM, Silva L, Fonseca R, Oliveira R, Gessner R, Gouveia E. Violetas: cinema & ação no enfrentamento da violência contra a mulher: concepções de subjetividade, gênero, cidadania e ludicidade nas regras e nas cartas do jogo. *Rev Interdisciplinar Cultura Sociedade (ROCS)* [Internet]. 2017 [cited 2017 Mar 30]; 3(esp):99-115. Available from: <http://www.periodicos eletronicos.ufma.br/index.php/ricultsociedade/article/view/6682/4302>
12. Pires MRGM, Guilhem D, Gottems LBD. The (IN)DICA-SUS game: a strategy of game-based learning on the Unified Health System. *Texto Contexto Enferm* [Internet]. 2013 [cited 2017 Mar 30]; 22(2):379-88. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072013000200014&lng=en&nrm=iso&tln=en
13. Silva LVS, Tanaka PSL, Pires MRGM. BANFISA and (IN)DICA-SUS in health undergraduate education: playing and learning construction s. *Rev Bras Enferm*. 2015; 68(1):124-30.
14. Pires MRGM, Gottems LBD, Silva LVS, Carvalho PA, Melo GF, Fonseca RMGS. Development and validation of an instrument for evaluating the ludicity of games in health education. *Rev Esc Enferm USP* [Internet]. 2015 Dec [cited 2017 Mar 30]; 49(6):978-87. Available from: <http://dx.doi.org/10.1590/S0080-623420150000600015>
15. Foucault M. *A ordem do discurso*. São Paulo (SP): Loyola; 2002.
16. Kuss DJ, Lopez-Fernandez O. Internet addiction and problematic Internet use: a systematic review of clinical research. *World J Psychiatry* [Internet]. 2016 Mar [cited 2017 Mar 26] 22; 6(1):143-76. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4804263/pdf/WJP-6-143.pdf>
17. Dörner R, Göbel S, Effelsberg W, Wiemeyer J. *Serious Games: foundations, conceptions and practice*. Switzerland (CH): Springer; 2016.
18. Freitas S, Liarokapis F. Serious games: a new paradigm for education. In: M M, Oikunomou A, Jain LC. *Serious Games and Edutainment Applications* [Internet]. London/New York: Springer, 2011 [cited 2017 Mar 26]. Available from: https://link.springer.com/chapter/10.1007/978-1-4471-2161-9_2
19. Madigan J. *Getting Gamers: the psychology of video games and their impact on the people who play them*. New York (US): Rowan & Littlefield; 2016.
20. Desurvire H, El-Nasr MS. Methods for game user research: studying player behavior to enhance game design, *IEEE Comput Graph Appl* [Internet]. 2013 Jul [cited 2017 Mar 26]; 33(4):82-7. Available from: <http://ieeexplore.ieee.org/document/6562711/?reload=true>
21. Bernhaupt R. *Game user experience evaluation*. Human-Computer Interaction Series [Internet]. New York (US): Springer; 2015 [cited 2017 Mar 26]. Available from: <http://www.springer.com/series/6033>
22. Abuhamedeh S, Csikszentmihalyi M. The importance of challenge for the enjoyment of intrinsically motivated goal-directed activities. *Pers Soc Psychol Bull* [Internet]. 2012 Mar [cited 2017 Mar 26]; 38(3):317-30. Available from: <http://journals.sagepub.com/doi/10.1177/0146167211427147>
23. Abuhanmdeh S; Csikszentmihalyi M, Jalal B. Enjoying the possibility of defeat: Outcome uncertainty, suspense, and intrinsic motivation. *Motiv Emot* [Internet]. 2015 [cited 2017 Mar 26]; 39(1):1-10. Available from: <https://link.springer.com/article/10.1007%2Fs11031-014-9425-2>
24. Csikszentmihalyi M. *A descoberta do fluxo: a psicologia do envolvimento com a vida cotidiana*. Rio de Janeiro (RJ): Rocco; 1999.
25. Backes VMS, Moya JLM, Prado ML, Menegaz JC, Cunha AP, Francisco BS. Expressões do conhecimento didático do conteúdo de um professor experimentado de enfermagem. *Texto Contexto Enferm* [Internet]. 2013 Sep [cited 2017 Mar 30]; 22(3):804-10. Available from: <http://dx.doi.org/10.1590/S0104-07072013000300029>

26. Garcia AM. A propósito do modo de perguntar de Nietzsche pela significação do niilismo. *Dissertatio* [Internet]. 2015 [cited 2017 Mar 26]; 41:229-47. Available from: <https://periodicos.ufpel.edu.br/ojs2/index.php/dissertatio/article/view/8509>
27. Horkheimer M. *Eclipse da Razão*. São Paulo (SP): Centauro; 2002.
28. Comte A. *Curso de filosofia positiva*. São Paulo (SP): Abril Cultural; 1978.
29. Larrosa J. *Tremores: escritos sobre a experiência*. Belo Horizonte (MG): Autêntica; 2016.
30. Nietzsche F. *Para além do bem e do mal*. São Paulo (SP): Companhia das Letras; 2005.
31. Benjamim W. *Obras escolhidas - magia e técnica, arte e política*. São Paulo (SP): Brasiliense; 1987.
32. Han BC. *Psicopolítica*. Lisboa (PT): Relógio D'água; 2014.
33. Han BC. *Sociedade do cansaço*. São Paulo (SP): Vozes; 2015.
34. Mouffe C. *Agonistics: thinking the word politically*. London (UK): Verso; 2013
35. Tongeron PV. Nossas virtudes: sobre o capítulo 7 de Para além de bem e do mal. *Cad Nietzsche*. 2016; 37(1):219-41.
36. Larrosa J. *Pedagogia profana: danças, piruetas e mascaradas*. Belo Horizonte (MG): Autêntica; 2015.
37. Creswell JW, Clarck VLP. *Pesquisa de métodos mistos*. Porto Alegre (RS): Penso; 2013.

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