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Design of Serious Games in the Teaching of Social Responsibility in Higher Education

Diseño de Serious Game para la enseñanza de la Responsabilidad Social en la Educación Superior

Design de serious game para o ensino da Responsabilidade Social na Educação Superior

Yemsi Vania Rodríguez Carranza* https://orcid.org/0000-0002-8563-3717

Vice Presidencia de Responsabilidad Social, Universidad San Ignacio de Loyola, Lima Perú

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Abstract. Management of university social responsibility requires the mainstreaming of contents on sustainable development and social responsibility in the academic field. In this context, this pedagogical experience explores the design of a serious game as a pedagogical tool to obtain an approximate and realistic knowledge of the concepts related to social responsibility, proposing the outline for historicization, referencing, and explaining processes for the design of social responsibility educational games aimed at undergraduate students. Its possible use as a platform for the creative development of students' sustainable innovation and as a method of evaluating knowledge acquisition of social responsibility is discussed.

Keywords:
educational game, simulation game, social responsibility, education on development, university.

Resumen. La gestión de la responsabilidad social universitaria exige la transversalización de contenidos sobre desarrollo sostenible y responsabilidad social en el campo académico. En tal sentido, la presente experiencia pedagógica explora el diseño de un *serious game* como herramienta pedagógica para obtener un conocimiento aproximado y realista de los conceptos relacionados con la responsabilidad social, planteando el esbozo de procesos de historización, referenciación y explicación para el diseño de juegos educativos de responsabilidad social orientado a estudiantes de

Palabras clave:
juego educativo, juego de simulación, responsabilidad

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***email:** yemsirodriguez@gmail.com

pregrado. Se discute su potencial como plataforma de desarrollo de la creatividad para la innovación sostenible en los estudiantes y sus posibilidades como método de evaluación de adquisición de conocimiento de la responsabilidad social.

social, educación sobre el desarrollo, universidad.

Resumo. A gestão da responsabilidade social universitária requer a incorporação de conteúdos sobre desenvolvimento sustentável e responsabilidade social no campo acadêmico. Neste sentido, a presente experiência pedagógica explora o design um *serious game* como ferramenta pedagógica para uma compreensão aproximada e realista dos conceitos relacionados com a responsabilidade social, planejando o esboço de processos de historização, referência e explicação para design de jogos educativos em responsabilidade social voltada para alunos de graduação. Discute-se o seu potencial como plataforma para o desenvolvimento da criatividade para a inovação sustentável em estudantes e suas possibilidades como método de avaliação da aquisição de conhecimento de responsabilidade social.

Palavras-chave: jogo educativo, jogo de simulação, responsabilidade social, educação sobre o desenvolvimento, universidade.

The management of University Social Responsibility (USR) requires structural changes based on the knowledge of the social responsibility and sustainable development concepts among main stakeholders in order to make substantial adjustments in universities. Different academic aspects are relevant, as there are various opinions about the concept of social responsibility. Therefore, universities could contemplate teaching methods based on active processes focused on students, in order to get to know these concepts through experience and connect them with their specialties, in a cross-sectional way and in interdisciplinary spaces.

An experience that suggests an educational game based on social responsibility is described, in order to propose it as a practical alternative for this institutional objective. As it is explained in this article, the serious game concept aims to fulfill educational purposes without leaving its game-nature behind. Based on some didactic principles, grounded on the application principles of social responsibility concepts, the goal is to promote the design of a learning game among students, so it can enhance different competencies such as creativity development and knowledge validation. The main objective is to enrich the “learn to be” educational pillar, from university education, through a play activity; in other words, the aim is to develop students’ “own independent, critical way of thinking and judgment so that they can make up their own minds on the best courses of action in the different circumstances in

their lives" (Delors, 1996, p. 7), as well as to practice critical judgment, improve decision-making and shoulder their responsibilities, which Delors described as "learning to live together." In this way, the experience seeks to innovate didactics and provide options for higher education students' autonomous learning aimed at social responsibility.

Integrating games in the classroom as a result of the teaching-learning process is a collaborative practice itself, which seeks to propose an alternative for students' knowledge appropriation primarily by means of the game design rather than its use. The experience presented here bets on "open innovation" for teaching social responsibility, and attempts to promote innovation for sustainability in the fields of professional development and citizenship in the long run.

Theoretical Framework

The theoretical framework of the experience presented here is based on education for development, as a context for the challenges set out by the United Nations in the Sustainable Development Goals (2015), which can be implemented in universities through social responsibility management. Later, the concept of University Social Responsibility is reviewed considering the existence of different theoretical-methodological approaches. Finally, serious games are described as tools for the development of creativity and innovation competencies.

Education for Development in Light of the Socioeconomic and Cultural Changes within the Fourth Industrial Revolution's Framework

Technological progress of the last three decades has been given different names in the scientific world, whose economic field has called it the fourth industrial revolution, suggested by Klaus Schwab in the 2015 World Economic Forum (Schwab, 2015). This author notes that this revolution mainly involves close collaboration between physical and cybernetic systems, based on the development of some countries in nanotechnology, biorobotics, and other fields that submit different proposals such as the internet of things, artificial intelligence, big data analytics, among others. The fourth industrial revolution brings a slow teaching "revolution" along. The development of new technologies and strategies to achieve relevant university competencies for new challenges is always distant. This distance is emphasized if the social knowledge apprehension process does not either give any quick response to or get feedback from technological development.

The use of technology in education is the first step for innovation, yet it does not make any drastic changes without new methods and educational contents. As Privateer (1999) claims, teaching technology is not the miracle cure, since it is useless if paired with archaic learning models. Technology in education is contradictorily useless if it is not reinforced by a mind

and a purpose. Again, we start wondering—if we ever stopped doing so—whether technology makes us dependent and education makes us robots. Thus, Schwab (2017) recommended that all stakeholders in educational institutions work together in order to analyze the fourth industrial revolution's boundaries in their academic, social, political, national, and industrial fields, as to guarantee that the revolution is focused on and empowers humans, instead of dividing and dehumanizing them.

Education can provide feedback to technological development, which will consist of new learning methods and guidance for contents, in order to guarantee its focus on humans. Regarding new learning methods, classroom-based education will make way for open innovation and collaborative construction of knowledge workshops (in which educational centers, universities, companies, and the community would participate). The creation of schools guaranteed education in the past; now virtual self-learning, multi-platforms, 3D printings, virtual reality with tutors, and other tools promise to take us towards an open and collaborative education, no matter how far we are or what language we speak. The industry has understood this, and has included open innovation spaces in its innovation strategies, creating collective authorship and open access products. By doing so, they have bridged the existing gap between what the market needs and what the university produces.

Regarding guidance for contents, the challenge of the human race is how to achieve sustainable development, and maybe its mysticism can make us remain humans in times of artificial intelligence. In order to reach this future with common welfare, the United Nations has designed seventeen Sustainable Development Goals (SDGs, United Nations, 2016) that are brought together in a joint commitment to achieve country goals by following the 2030 agenda (United Nations, 2015). In particular, the seventh target of the fourth SDG, Quality Education, is to "ensure that all learners acquire the knowledge and skills needed to promote global citizenship," thus it encourages education for sustainable development (ESD). The United Nations Educational, Scientific and Cultural Organization believes ESD is crucial not only to achieve the 2030 agenda, but also to accelerate progress towards sustainable development (UNESCO, 2018).

Even though it is true that the S-curve of technological evolution could touch the S-curve of educational innovation, thus boosting the latter, this change will not be meaningful unless urgent problems for human race are solved, such as climate change or disaster risk management. Universities have the potential to research and develop possible solutions for these problems, only if they practice, question, and assess their tripartite mission (to spread, generate and socialize knowledge) based on social responsibility.

University Social Responsibility

In Peru, the primary precedent of university social responsibility practice was the management of university impact as an institutional space of commitment with the society. Even though

this task was considered in the University Act back then, it did not have the same monitoring or relevance compared to the current certification processes required by the National Superintendence of University Higher Education (Superintendencia Nacional de Educación Superior). The current University Act describes university social responsibility as the "ethical and effective management of the impact generated by universities in the society through the exercise of their functions" (Law No. 30220, El Peruano, 2014).

In this regard, university social responsibility strategies had to be redefined by identifying their actions, putting efforts together, and reorganizing information based on the university social responsibility concept. Many universities had wide experience in university impact, mainly in student volunteer work, which accelerated the submission of reports and the achievement of new standards. However, the implementation of university social responsibility in its academic function has been generally slower in its disposition and not widely spread in university reports, institutional memories, and sustainability reports of universities.

Larrán, Herrera, Calzado, and Andrades (2015) claim that the discussion of the university's role to achieve sustainable development has become more significant in the last few decades. Europeans have agreed on protocols, gathered experiences, and established legislative reforms in order to adapt to new educational conditions. On the other hand, the Union of University Social Responsibility of Latin America (URSULA) guides the process of creation and systematization of university social responsibility indicators in Latin America. Based on the review of the Peruvian situation, there are some examples of academic strategies that adopt common guidelines with a basis on university social responsibility:

a) Coordination of social responsibility contents and orientation of courses towards sustainable development and social responsibility goals (such as implementing risk management in course contents in the Pontificia Universidad Católica del Perú [PUCP], as part of the application of its institutional policy regarding disaster risk management (Dirección Académica de Responsabilidad Social [DARS], 2017)).

b) Social responsibility courses in specialties, mainly corporate social responsibility, in different universities, such as the "Citizenship and Social Responsibility" course in PUCP General Studies (PUCP, n.d.) or the Universidad Los Ángeles de Chimbote. Both universities consider social responsibility as a cross-cutting priority in their curriculum (Uladech, 2016), integrating various two-credit mandatory courses in their majors (Uladech, n.d.).

c) Undergraduate specialties, such as the specialization in sustainability and social responsibility of the Universidad San Ignacio de Loyola (USIL) (Responsabilidad Social USIL, n.d.) and the specialization in social responsibility of the Universidad ESAN (Alfaro, 2017).

d) Institutes and research & study circles (for instance, the Study Center for Sustainable Development [Centro de estudios para el desarrollo sostenible] of the Universidad de

Lima (Quijandría, 2017)).

e) Research of the impact on sustainable development goals, as in the Universidad César Vallejo, where schools develop projects for the community between professors and students, which are part of the learning-service methodology (UCV, 2017).

f) Discussion and academic promotion activities, such as the Corporate Social Responsibility Conference (Encuentro de Responsabilidad Social Empresarial) of the Universidad Peruana de Ciencias Aplicadas (UPC, 2016).

g) Practical courses of social responsibility, such as the Social Outreach course of the Universidad del Pacífico, which integrates a practical learning methodology in a comprehensive way and involves the development of socio-emotional skills (Pérez, 2017).

Educational Games

Nah, Telaprolu, Rallapalli, and Venkata (2013) described *gaming* as the process of using game elements and playing with mechanisms so that players can solve problems. In many cases, gaming means considering the entertainment function of games as a method instead of the ultimate aim. Gaming can refer to the design or use of a game for learning, either inside or outside the environment of technological games design experts. Martens and Holger (2008) classified learning games according to three aspects: learning, simulation and games. One aspect is prioritized in different times, yet the consolidation of learning based on games is related to the interaction of all three aspects. Laamarti, Eid, and Saddik (2014) argued that the use of serious games originated with military entertainment and was implemented in the educational field afterwards; they also mentioned that a sophisticated design needs to be elaborated so that games can address specific learning needs. The authors also stated that games could achieve connectedness, which can contribute to social well-being, and even generate novel forms of communication between players. Allal-Chérif, Bidan, and Makhlouf (2016) noted that the biggest companies have been integrating serious games to select, hire, and train their employees since the mid-2000s. Companies such as MAPHE, General Electric, Coca-Cola, Nestlé, Volkswagen, Renault, L'Oreal, and Airbus Group have particularly implemented serious games to train and educate both beginners and experts.

Allal-Chérif et al. (2016) observed that the financial sector started implementing serious games, which reached their boom in the 2008 crisis, when games were used to develop skills in both employees and consumers (CAC 40 case in France). It is important to mention HSBC bank's initiative with the game SOS 21, which is oriented towards sustainability from the virtual platform. The use of games in andragogy, which is the study of adult education, has been less investigated than in school, partly because it is considered that the student's maturity and learning process can and should be focused on reading and writing.

Even though the learning process of adults is different when it comes to objectives, knowledge depth, and learning time, this process cannot avoid the possibility for generating learning contexts that facilitate data understanding and processing, and that help us focus on analysis and quick response based on adult creativity. After understanding this creativity, as well as other factors, higher education started implementing games. As previously mentioned, we need teachers with clear concepts, and it is also crucial to consolidate topics, class models, methodologies, assessment matrices, indicators, and academic verification methods. Moreover, it is necessary to innovate curriculum didactics, which is a problem that education for development has to solve after understanding the role of creativity and creating spaces for its development. We cannot have resilient or innovative students without creativity.

Despite traditional education, creativity is not exclusive to art courses or children. We need to make an effort to implement creativity as an educational goal in all levels and courses. In order to achieve this, it is important to understand the difference between a child's fanciful imagination and adult creativity, since the latter has the ability to solve real problems. Vygotsky describes the difference between subjective creativity, related to self-conception, and objective creativity, which enables mental development and social interaction in adult life. In his article *Imagination and Creativity in Childhood*, Vygotsky states that "the development of a creative individual, one who strives for the future, is enabled by creative imagination embodied in the present" (Vygotsky, 1999, Chapter 8). Limiñana notes that a child's freedom and confidence evolve and merge with adult cognitive and social skills, "therefore raising new ways of imagination and leading to a distinct type of creative activity, different to that of the child, which will enable mature and productive creative thinking in adulthood" (Limiñana, 2008, p. 42).

In other words, the creative process starts in childhood, but its potential for social creation consolidates during adulthood, as the abstraction and conceptualization capacities consolidate as well. Some universities and professors have understood this, and they have implemented the use of gaming with Lego's serious games and stock-market simulators in higher education, mainly in undergraduate programs because of the influence of corporate games.

According to The NMC Horizon Report: 2014 Higher Education Edition (Johnson, Adams Becker, Estrada & Freeman, 2014), institutions have become more interested in *gamification* among students (use of games in non-conventional spaces), and the introduction of various experiences with games in institutions and educational programs. These experiences show pedagogical benefits, such as motivation, creative problem-solving, and ethical behavior. Gaming motivates students, who feel more excited with playful formats rather than virtual presentations and the instructor's voice. Games themselves can gather students' attention. Based on literature review, Mora, Riera, González, and Arnedo-Moreno (2017) argue that games promote self-learning, and they improve emotional and cognitive learning as well. The authors also note that, for instance, simulation games have had benefits in health science education,

such as improving retention of knowledge and reducing stress when studying. Regarding creative problem-solving, the research study of Bezanilla et al. (2014) points out that first year and last year undergraduate students developed communication or behavior strategies through game-based learning, in order to reach a goal within the established context on a trial-and-error basis.

Vermillion (2017) argues that common decision-making scenarios, such as written narratives and surveys, have limitations when studying more complex scenarios. He remarks that didactic games should consider both the rational and emotional profiles of students, so that they can make decisions and deal with the consequences. Thus, rational decision-makers should rank alternatives based on their future outcomes only. These studies have shown that emotional changes can alter decisions due to stimuli in more realistic contexts. Furthermore, these group decisions seem to promote common ethical behavior rather than competition. In order to prove this, the tools developed by Utesh, Heininger, and Krcmar (2015) in the *Technische Universität München* could be used to obtain a player's previous profile and his/her perceptions about the possible impacts on self-perception after using the game. In any case, in spite of the introduction of didactic games in universities and higher study centers, more studies and experiences are still needed for games to become more popular.

Nevertheless, Mora et al. (2017) note that one of the main flaws of this pedagogical process is the gamification design framework, so we still need to delimit techniques to identify and develop creativity in young adults, which will enable the identification of creativity as a component of pedagogical techniques, thus leading us to a design framework. Therefore, we need to redesign and establish educational games to make the most of their potential. Contreras Espinosa, Eguia Gómez, and Solano Albajes (2016) remark that we need to consider the process as part of the research, and that we need to focus on research within the research-action framework for the design of pedagogical games co-created by students and teachers. Meanwhile, methodological proposals based on literature review of applications and creations, especially within the software engineering field, have been formulated, considering the exercise of skills of game development for the educational field.

Allal-Chéril et al. (2016) identified seven steps in the process of cognitive development based on serious games: 1) historization (analysis of remarkable situations in the organization), 2) referencing (identification of knowledge and competencies), 3) explicitation (formalization and architecture of knowledge), 4) design (definition of scenarios, educational goals, and game models), 5) control (testing and enrichment by experts and trainees), 6) adoption (dissemination of training protocols), and 7) sophistication (evolution based on feedback and environmental changes). These seven methodological steps can promote joint creation between teachers and students, since they provide greater space for contextualization and guidance of the game during the initial steps (historization and explicitation), compared to the outline of the

technical design of a game (videogame, simulation game, or other types), which is centered on the product rather than the process. In this regard, Barajas, Álvarez, Mendoza, and Oviedo de Luna (2015) state that we should consider what is right in the development of a game, as well as what is wrong or what could be improved along the process. Gathering this information would help us understand the qualitative aspect of the process, which should be taken into consideration, especially in the current context of little standardization in the collaborative design of didactic games.

The conclusions of Ravyse, Blignaut, Leendertz, and Woolner (2017) are therefore relevant, since the authors propose five central serious game themes, based on research with a focus on development errors of educational games. The five themes are backstory and production; realism; artificial intelligence and adaptivity; interaction; and feedback and debriefing.

The methodology of pedagogical games offers a more realistic view of the competencies that universities try to develop in their students. Besides skills, competencies—such as critical judgment and decision-making—should be considered as an active part of student learning. Students who are assessed with traditional activities almost never face real problems with open solutions. Moreover, Bezanilla et al. (2014) explain that university students do not participate during formative assessment, and professors are not allowed to give counseling. Therefore, the authors argue that game-based learning is better than traditional assessment, yet it is not used in spite of not being new when it comes to assessing students. They also note that implementing game-based learning is complicated and limited. For this reason, using games is an interesting proposal not only for instruction, but also for educational activities and on-going assessment processes, i.e. assessment of students and production oriented to instructors.

Because of specialized education in universities, based on professional majors, there is no feedback between specialties or inter-disciplinary spaces for decision-making. Thus, non-simulation games—and multiplayer games in most cases—make decision-making even more realistic.

METHODOLOGY

The serious game study presented here is based on the search of pedagogical methods to practice adult creativity for understanding and exploring solutions for sustainable development. This practice is oriented towards the education for development field. This study follows the seven steps proposed by Allal-Chérif et al. (2016) for the process of cognitive development in serious games. We provided guidelines for the first four steps, which will be defined to continue with the other three later. The following are some related aspects:

a) Historization: We proposed an analysis of the relevant problems of modern Peruvian society. The analysis was part of a former research on compliance indicators of

development goals in Peru. We asked participants to include relevant goals based on the game storyline.

b) Referencing: We listed the main concepts related to social responsibility and sustainable development; use of concepts and answer validation were required. The knowledge of subjects and matters included in the ISO 26000 standard was the application scenario of critical judgment and creativity competencies for proposing solutions.

c) Explicitation: We established rules to play the game, with questions, actions, time frames, levels, etc. Every game proposal considered norms and freedom spaces for players.

d) Design: Without any restrictions, students had to suggest scenarios where they could practice social responsibility (the jungle-coast route of a mining company, for instance). Students were assessed after justifying their choice and the objectives they had proposed. The game model often started with traditional board game structures.

This experiment is oriented to complete the seven methodological steps that were previously mentioned, and to assess creativity as a substantial component during its development. In this regard, it would be interesting to follow the research-action approach and adapt certain research tools to reach specific goals of pedagogical assessment regarding game design and its use for evaluation.

Case Study

Mainstreaming the social responsibility curriculum is a difficult task. It requires that all university schools and majors set out a course of action for social responsibility, and include content about sustainable development and social responsibility in course plans. Plus, they also need to create opportunities for impact and research. Regarding one of the relevant aspects, professors of different courses should be trained in social responsibility content and applications, starting with actions and opportunities that their university can offer for the academic development of the university community. USIL university is making an effort to achieve this goal through the Social Responsibility course in its programs. Universidad de Lima has workshops of design and development of social responsibility projects as well, both oriented to instructors.

However, prejudices about USR are seen in class, partly because many professors do not have much experience applying social responsibility in their professional lives. Due to this, some professors do not include social responsibility topics in their classes, and they waste the cognitive, volitional, and creative potential of its use in a whole class. A social responsibility course is useless if students are not required to evaluate materials according to circular economy criteria, consider stakeholders, and plan and manage social risk (in a construction project, for instance).

USIL is a Peruvian university with almost 50 years of establishment. It has eight schools, mainly related to management and entrepreneurship majors, and stands out because of its

internationalization programs. One of the university pillars is social responsibility (USIL, n.d.), and USIL offers a specialization in Sustainability and Social Responsibility to undergraduate students of almost every major. Students between the 7th and 10th semester must pass four courses in order to obtain the specialization. These courses are: a) Fundamentals of Sustainable Development (students study proposals of innovative solutions to problems caused by companies that make money in a non-sustainable way); b) Design and Assessment of Social Responsibility Projects (focused on tools to plan, design, and manage a social responsibility project in companies); c) Social Responsibility and Public Policies (students design social responsible projects oriented to improve the life quality of inhabitants, taking public policies and the methodology of the current Peruvian public investment process as reference) (USIL, n.d.).

They are four-credit courses that any 7th-10th semester student can take as elective courses. Therefore, some students can only take one course of the specialization, depending on their interest and available credits. Plus, students can start with the Design and Assessment of Social Responsibility Projects course, Social Responsibility Management, or Fundamentals of Sustainable Development in any order, since there are no requirements to register for these courses. The only course that has requirements to register is Social Responsibility and Public Policies, thus students need to take the Design and Assessment of Social Responsibility Projects course before.

There are students of different majors in the specialization classes; therefore, based on educational standards, it is possible to work in a cross-sectional way, and complement skills and approaches. Didactic techniques are required in order to manage heterogeneous groups and guide the creation of cross-sectional academic works.

The 2018 curriculum update has modified the evaluation structure of all courses in the specialization so that students are assessed through on-going assessment only (mid-term and final exams have been discarded). The design of the specialization courses consider education based on projects, in which the final project evaluation has greater importance, and it is developed in a progressive way with the help of professors throughout the course.

The experience presented here was developed in the Social Responsibility Management course, which researches social responsibility topics in order to validate, complement, reorient, and implement proposals that promote sustainable development in companies and individuals (USIL, n.d.). The course focuses on actions of social responsibility in organizations, mainly in companies, and provides tools, indicators, and management protocols (the ISO 26000 standard in particular). As other courses, it integrates readings, tasks and tests, which will enrich the course final project.

This final project implemented didactic experimentation, which consisted of groups creating board games about social responsibility management. The experiment was conducted in five classrooms during the 2017-01 and 2017-02 semesters, in three classes each semester,

with around 30 students divided in six groups of five people.

The experience presented here involved guidance for the design of a board game in groups: the professor gave instructions to students, who had to integrate relevant contents according to the course objectives, and make the game attractive as a playful tool for learning. Students, who were between 19 and 23 years old, do not usually participate in offline games. It is clear that students could be better prepared if they had experience playing such games. At present, most students do not participate in direct contact games, which are becoming popular again. According to *Gestión* newspaper (2017), Peru is one of the fastest growing markets in this field in Latin America.

Objectives

Experimentation in the design of serious games for learning aims to encourage the development of concept and practice of social responsibility, starting with the development of cognitive aspects and creativity in students. It is also a methodological tool for professors.

Regarding the cognitive aspect, experimentation aims to expand the knowledge of concepts related to social responsibility through simulation and the use of concepts in game architecture. By doing so, it aims to integrate professional processes and social responsibility. For instance, by searching examples or situations related to consumers, it is possible to understand that social responsibility is not only related to the community. Or by providing an oil spill scenario, it is possible to ask students to suggest how to enhance the processes.

Regarding the creative aspect, the design of a game offers initiatives and favorable environment for studying, as well as creative construction of assessment situations. For the most part, simulated decision-making enables critical judgment to be free and provide open solutions considering impact and defined relations.

Regarding the methodological aspect, experimentation aims to be a relevant assessment mechanism for progressive education. It can summarize and evidence acquired knowledge and creativity of students. Finally, games as a product are didactic material that can be used and improved later for other audiences.

In the medium-term, the games designed here can be available in different platforms (augmented reality or videogame, for instance) that will connect the community with the sustainability pillar of universities.

Participants

As previously mentioned, students of the specialization courses are young adults between 19 and 23 years old. The classrooms of attendance-based courses had up to 30 students, who were enrolled in the hospitality management, tourism and gastronomy, architecture, business sciences, health sciences, law, education, humanities, and engineering schools.

The experiment was conducted with classes of the 2018-2 semester, which had 84 students registered in total. More than 40% of students with the national scholarship *Beca 18* (scholarship for outstanding performance, orphanhood, internal armed conflict victims, among other categories in the program) of different majors were included in the classrooms.

In the first classroom, the majors with more students were psychology with eight students, business engineering with six, civil engineering with six, and management with four. In the second classroom, the majors with more students were psychology with eleven students, management with seven, and international business with four. The psychology major had many students in this research study, but classrooms usually have students of different majors, and majors or number of students per class are not always the same.

Procedure for the Game Design

Students had to create their own games and present two items by the end of the course: the physical game prototype and the game instructions. The instructions file had the following sections: description, prototype content, objective, target audience, number of players or teams, participants/players, components, game mode, and rules.

The game presented the following mandatory items:

a) Knowledge of sustainable development goals: The game had to explain and show at least two sustainable development goals through compliance of indicators for these goals, with one or many actions of players.

b) Disaster risk management: The game had to show, at least, two accidental occasions of natural disasters (earthquake, drought, flood, cold wave, El Nino or La Nina phenomena, dollar depreciation, among others) that affect all players, according to their characteristics.

c) Memorization of concepts: The game had to include a review of the topics seen in class (social responsibility, sustainable development, philanthropy, social investment, etc.) in order to present the concept to unexperienced players.

d) Decision-making in cases related to social responsibility management: According to their own research, they had to gather and adapt, at least, eight emblematic cases of actions of business social responsibility management (appropriate or inappropriate management). Names of companies and organizations were omitted.

e) Open decision-making: Students had to create, at least, three open answer situations, in which players had to weigh the impact of their decisions.

f) Close decision-making: Players would receive punishment or rewards based on the decisions set by the game and its designers, with regard to the examples or situations presented, which could derive from item D.

g) It is important to note that instructions related to philanthropic actions were not included

in the game design. Even though they are necessary and part of the social responsibility tradition, their omission made students come up with more complex actions of greater social impact.

Stages

The activity objectives were explained to students at the beginning of the course. Later, the game workshop of Social Responsibility Management was conducted in four sessions: a) session of model prototype and game dynamics; b) session of game design; c) session of play testing, and d) session of game assessment.

Board Game Design in the Classroom

The proposal was notified to students from the beginning to the end of the semester, in order to develop its preparation. Instructive videos of some board games were shared, since students stated that they only knew around three board games (Monopoly, Pictionary, and Ludo were the most popular among students), yet they did not use or play them. The game was developed and assessed between both professors and students divided in work groups. A four-session workshop was conducted, in which the prototypes were developed with the assistance of professors. The sessions were focused on the following:

Session of model prototype and game dynamics: In this first stage, the preliminary version of models or game tables was developed. In many cases, various changes were made to the original design. Most students presented models that resembled traditional games, since most models required players to race along the board and reach the last space in order to win. Common recommendations aimed at representing the required items in a graphic way, thus many models had an architecture of "entrepreneurial city", "industrial sector", "tour around Peru," etc. Models were built with recycled material of architecture, engineering, and education school projects.

Session of game design: The game had been previously designed, but it was improved in this session with the assistance of professors, who helped students by asking questions about the relevance of the game questions, sequences or rules. In many cases, students helped each other with question cards, characters or sequences. Participants played the games by the end of the session, in order to rectify the most relevant errors, and check the clarity of questions and use of concepts. The game rules were modified in the corresponding document.

Session of play testing: Teams included two turns in their prototypes, mainly because they had to adjust the time frames, game flow, and number of players.

Session of game assessment: Each team presented both the printed rules and the finished game. Later, groups tested other groups' games in order to play and assess them, so all students played every game created. After playing a game, each group assessed it with an analytical matrix.

Assessment

Generally speaking, students had a positive perception of the activity, and games offered proper learning. In order to assess the game, two documents were considered: the professor's evaluation, and evaluation and anonymous self-evaluation of groups. The first evaluation involved an assessment matrix with these indicators: compliance of instructions, game clarity and flow, design oriented towards understanding of social responsibility and sustainability, proper use of concepts, and innovation in structures and contents. Students were asked to assess their own games and other groups' games with the same indicators provided to professors in a Likert scale. Student evaluation was conducted by the professor in order to justify the scores given.

The evaluation assessed the creativity and content objectives. The B, C and E indicators assessed the creativity level of students.

- Game clarity and flow: Students must design a strategy that includes the contents and is attractive as a game as well. Creativity is needed to create a storyline and set rules that do not interrupt the story.
- Design oriented towards understanding of social responsibility and sustainability: Students must simulate game situations that can show and reproduce social responsibility concepts. Group members came up with and coordinated ideas in order to select real situations and its reproduction to fit in with the examples provided. It is important to note that students were asked to include decision-making spaces in the games, thus the designed context had to provide players with opportunities to make realistic decisions.
- Innovation in structures and contents: Instructions were given to maintain equal conditions for all assessed games. However, students were encouraged to innovate in game conditions, and include extra contents and game structures only if they followed the instructions.

The other two indicators were related to the course content. The conceptual component of the course included knowledge of development goals, disaster risk management, and the ISO 26000 standard.

- Compliance of instructions: The concept of a game with a decision-making component involved understanding the possible consequences of players' actions in an objective way, and establishing a system of earnings and rewards. It was important to understand the game objective and link the concepts provided in the instructions, so that they can become one block when combined.
- Proper use of concepts: Students had to understand the concepts to come up with a context, solution alternatives, or a game logic. Therefore, they had to know and show impact examples or theoretical concepts.

Improvements

As previously mentioned, the experience is meant to end with a research on the game significance. The game is currently under a previous validation stage. It has been tested during two semesters, and the aim is to consider more complex structures of interaction with students, a more detailed record, and the importance of designing games for content assessment.

The main improvements introduced were the following:

a) Extra time for development: The activity was meant to be developed in eight hours of autonomous learning, but 24 hours were needed (at least three sessions) in the classroom so that students can meet without any problems.

b) Counseling for the game design: It was necessary to allow time for counseling in class, and provide spaces for open consultation and feedback in the classroom. Since students were placed in only one classroom, they had the chance to learn from other groups' progress.

c) Game testing: Students were asked to create a video to explain the game dynamics in the first semester, but this evaluation was limited, since students were not able to identify possible problems in their instructions or questions (because they created their own videos). Other groups were required to participate the second time, so the final product was better.

Results

Twelve games developed by students were the result of this experience. The most popular games were the ones which included physical components, such as roulettes and bells, for decision-making. The architecture of games was based on traditional games: seven were based on Ludo, three were based on Monopoly, and one was based on Jenga.

Students showed enthusiasm and commitment in the development of games. After the assessment based on indicators conducted by the professor and students, they concluded that games were successful. Since the activity was carried out with the help of professors, the compliance indicator was developed with the design oriented towards the game. This was not the case of the proper use of concepts indicator, since the examples were not related to the proposal in most cases. This especially happened with contents related to the ISO 26000 standard, whose examples were inaccurate or unclear sometimes, thus getting lower scores given by peers.

Regarding game clarity and flow, students found it easy to give a unanimous score for this indicator. However, self-assessment was hard for some groups when giving a score, since students felt empathy for the hard time they experienced while designing their own games. For this indicator, the professor considered that only four games showed enough flow to maintain their recreational function.

Innovation in structures and contents had the lowest scores. Students gave themselves low scores because they did not use many interesting strategies, according to them. This could evidence a problem in the experiment design regarding its structure or length.

CONCLUSIONS

The management of university social responsibility requires varied strategies to teach social responsibility to students, especially when it comes to basic concepts, which can dismantle prejudices and raise awareness of their effective application. The main concept is that responsible decision-making involves all aspects related to life in society, within a professional field or a labor organization.

Education for development should be included in the university curriculum as part of the management of institutional responsibility. This should be done by combining simulations and real problems that future professionals will face.

The request of including curriculum contents of social responsibility implies that professors and universities should understand that they need to know concepts and apply them to research studies, discussions, and creation activities within the classroom. The recreational contexts are interesting for this purpose, since they are developed by young adults who put their mature creativity into practice, rather than their basic childlike imagination, which they usually associate to the concept of creativity.

The design of an educational game has potential to achieve the cognitive goal related to the application of social responsibility concepts in future professional situations. It also promotes creativity when reproducing responsible decision-making and design of realistic situations.

The first four steps proposed by Allal-Chérif et al. (2016) were applied to the experiment. We established guidelines to create games based on six specific instructions for game architecture, and we included procedures for counseling and game testing sessions.

Finally, the final project of the Social Responsibility Management course was the game, and assessment rubrics in Likert scale were set out for students and the professors. The results showed that students managed to understand social responsibility concepts and present realistic cases for decision-making.

The assessment and joint design allowed students to interiorize knowledge, since they were required to research, study on their own, and innovate. Students also had to question themselves regarding the importance of social responsibility in the proposed context, their ethical attitude towards a moral dilemma, the impact of their decisions within society, and the challenges of their generation in light of sustainable development.

This evaluative proposal offers opportunities for dialogue between students and professors, increasing students' participation in class, and achieving the principle of dialogue and joint action required by university social responsibility. In this way, serious games can provide tools for learning and creativity development of future professionals as responsible agents.

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