PRIORITIZATION OF CITIZEN COMPETENCIES IN A GAMIFICATION CONTEXT

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Priorización de competencias ciudadanas en un contexto gamificado

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Abstract: Citizens skills are fundamental to build coexistence, promote sustainable development and in general, to educate good citizens. However, in Colombia, according to the results of the Saber tests, the development of these competencies is still deficient, and the problem is critical in the context of virtual education due to the fact that students' motivation to learn is lost more easily. A gamification tool that allows increasing motivational levels while teaching citizens competencies is a solution proposed by a team of Colombian researchers. This paper presents a prioritization exercise that allowed the project team to select priority competencies to be gamified using a formal prioritization method. The method used involved the design of data collection instruments, consulting with experts using the Delphi method, conducting focus groups, calculating results by quartiles, and validating and contrasting final results. Results indicate that, in the particular context of gamification and virtual education, communicative citizen competencies, specifically in writing, along with cognitive citizen competencies, are the most relevant.
Citizen competencies; virtual education; gamification; Delphi method; reading-writing competences; cognitive citizen competences.
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Keywords: Citizen competencies, virtual education, gamification, Delphi method, reading-writing competences, cognitive citizen competences.

Resumen: Las competencias ciudadanas son fundamentales para construir convivencia, promover el desarrollo sostenible y, en general, para formar buenos ciudadanos. Sin embargo, en Colombia, de acuerdo con los resultados de las Pruebas Saber, el desarrollo de estas competencias es aún deficiente, y el problema es especialmente agudo en la educación virtual, pues los estudiantes pierden más fácilmente su motivación para aprender. Una herramienta gamificada que permita incrementar tales niveles motivacionales, al tiempo que enseñe sobre competencias ciudadanas, es una solución propuesta por un equipo de investigadores colombianos. En este documento se presenta un ejercicio de priorización que permitió al equipo de proyecto seleccionar, usando un método formal de priorización, aquellas competencias prioritarias para ser gamificadas. El método usado implicó el diseño de instrumentos de recolección de información, la consulta a expertos mediante el método Delphi, la realización de grupos focales, el cálculo de resultados por cuartiles y la validación y contraste de resultados finales. Los resultados indican que, en este contexto particular de gamificación y educación virtual,

las competencias ciudadanas de tipo comunicativo en concreto, las competencias de escritura, junto con las competencias ciudadanas de tipo cognitivo son las más relevantes.
Palabras clave: Educación virtual, gamificación, método Delphi, competencias de lectoescritura, competencias ciudadanas.

INTRODUCTION

Citizen competencies entail skills and knowledge required to build coexistence and value pluralism, these are key to promote sustainable development (Restrepo, 2006). Various research has found that encouraging citizen education in educational institutions can yield large benefits (Castro, 2014). Consequently, academia can play a decisive role as it is destined to furnish students with strategies to foster the development of citizen skills.

Additionally, citizen competencies are indispensable to drive civic participation and social development, both of which are significantly important in the current Colombian context, great efforts are conducted in this country to identify alternatives to peacefully solve conflicts, overcome social exclusion, open new spaces for citizen participation, deal with elevated corruption indexes and keep more harmonious relationships (ICFES, 2018a). The Saber test, which takes place every semester in Colombia, is a mechanism to measure the development of different competencies in young students (including citizen competencies). Results of the Saber test in recent years have not been very encouraging: in 2017, 49% of youngsters accepted any manifestation of violence, and 41% of these disobeyed the law (Granja, 2017).

Evidently, there is a need to develop tools to improve students' civic knowledge and attitudes in every educational modality. Although it is worth mentioning that the virtual modality requires these tools to be based on pedagogical resources that increase motivation to learn, as virtual education's particularities make it difficult for teachers and students to connect as learning peers, which can oftentimes result in students failing to clearly identify the purpose of a particular educational activity. Amid this context in Colombia, a project named "Didactic-City" has been developed, it is based on the design of a motivational didactic tool generated by principles of gamification and devised to strengthen teaching-learning processes of citizen competencies in virtual educational programs; the project uses gamification as a core motivational element for students, and it considers that its application makes academic activities more dynamic and participative (Acosta-Medina, Torres-Barreto, & Alvarez-Melgarejo, 2020; Vanduhe et al., 2019).

However, taking into account that citizen competencies comprise a wide array of skills (including cognitive, communicative, emotional and conciliatory) and that learning said competencies requires designing a particular typology-based context (Mar, 2007), the Didactic-City project suggests an evident need to focus and delimit the approach, and proposes defining the most relevant citizen competencies for the project's

target population: young university students enrolled in virtual academic programs. This selection is based on a formal prioritization exercise that applies a formal quantitative methodology that considers multiple factors related to students' context and needs. This paper is divided in four sections: the first explains the theoretical framework; the second describes the methodology applied in the prioritization process; the third details the results of the application of said methodology; and the last one broadens the research's conclusions.

THEORETICAL FRAMEWORK

Citizen competencies are a set of attitudes, knowledge and skills which, if correctly articulated, make it possible for citizens to effectively build a democratic, peaceful and inclusive society (Guerra, 2014; Ministerio de Educacion Nacional de Colombia, 2006). These imply the development of individuals' interactions with others or with nature, which requires the unlimited use of knowledge and values to attain individual and collective awareness, commitment and responsibility towards society's dilemmas (Zambrano, 2018). Perspectives on citizenship vary from one country to another: in Colombia, citizen competencies are classified as cognitive, communicative, emotional and conciliatory (ICFES, 2018b).

Cognitive Competencies.

1.1.1. Pertain to mental capacities that are fundamental to exercise citizenship, and which strengthen critical thinking and problem-solving skills (Zambrano Ojeda, Fernandez Candama, Rivera Cisnero, & Zapata Zapata, 2014; Daza-Orozco, 2019). These skills support people's critical thinking and constitute a significant tool to prevent violence in society (Chaux, Velasquez, & Bouvier, 2004). Cognitive competencies are classified as knowledge, argumentation, multiple perspectives and systemic thinking. Knowledge includes concepts and principles that are critical to exercise citizenship, build coexistence, participate democratically and value pluralism, i.e., the 1991 Political Constitution of Colombia, organization of the Colombian state, its political structure and models of citizen participation (Chaux, Lleras, & Velasquez, 2004). For its part, argumentation is regarded as the capacity to evaluate and analyze arguments (personal or by third parties) that are formulated concerning public issues in order to have an autonomous stance. Likewise, it refers to the capacity to question and assess the validity of any type of information, belief or decision (Chaux, Lleras Ana Maria Velasquez, et al., 2004). Similarly, multiple perspectives refer to the ability of identifying conflict and parties involved, as well as their interests and perspectives. It leads to mutually beneficial agreements and to constructive and peaceful interaction with others. Also, it is significant for society because citizens' are constantly sharing common spaces. Every public situation requires the capacity to understand the parties involved (Ramos, Nieto, & Chaux, 2007). On the other hand, systemic thinking is the capacity to understand reality identifying relationships between

dimensions of social problems and alternative solutions. The need to develop this competency is based on the complexity of social situations, since it enables citizens to develop a more complete understanding of events (ICFES, 2018b).

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Communicative Competencies. Are the capacities required to establish constructive and assertive dialogs with others, leading to reciprocal and equitable interpersonal relationships built in conjunction with active listening and argumentation (Aparicio, Torres-Barreto, & Alvarez-Melgarejo, 2018). Mainly, communication takes place through oral and written media. Oral competencies refer to the capacity to exchange ideas through direct dialog, understand speeches and address a group of people with coherence and propriety. Written communicative competencies include the ability to understand texts that are relatively complex or long, and to write clear, precise, coherent, structured and pertinent texts (ICFES, 2018b).

Emotional Competencies. These abilities help identify a person's own emotions and others', and to constructively respond to them; moreover, these competencies facilitate an adequate control, understanding and expression of feelings based on understanding the reason for the presence of feelings (Zambrano Ojeda et al., 2014). Empathy and emotion management (Norman Acevedo, Quintana, & Ortegon Cortazar, 2015) are notable examples. Empathy is the capacity to notice, understand and experience similar feelings to those felt by others[i]; this is a fundamental capacity for citizens because it invites individuals to spare others from pain and to prevent discrimination of certain social groups (ICFES, 2018b). On the other hand, emotion management allows people to master their own concerns to express them in constructively, favoring good relationships with others (Ramos et al., 2007).

Conciliatory Competencies. These gather the other competencies in action, and help individuals in certain contexts, facing real situations, perform as competent citizens by training and encouraging particular citizen attitudes and actions. Since the other types of citizen competencies have a holistic nature, the correct performance of one is connected with training in the others (Chaux, Lleras Ana María Velasquez, et al., 2004; ICFES, 2018b). According to the Gestalt theory, citizen competencies can be studied from the perspectives of three relationship contexts: "oneself", "others" and "the environment" (see Table 1). This theory asserts that in order to attain meaningful learning, work must be done based on: (1) individuality, connecting knowledge with personal experience and view of the world; (2) relationships with other elements in the field that affect behavior; and (3) relationships with the field in itself, with "the field" being a set of elements with particular individuality (Mar, 2007). Therefore, citizen education must aim at encouraging meaningful learning, according to students' relationship with each context.

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		Contexts			
		Oneself	Others	Environment	
Cognitive	Knowledge				Conciliatory
	Argumentation				
	Multiple perspectives				
	Systemic thinking				
Emotional	Empathy				
	Managing emotions				
Communicative	Oral				
	Written				

Table 1. *Citizen competencies and relationship contexts.*
Source: compiled by the authors.

Table 1

METHOD

The team set out to define the types of citizen competencies to be addressed by the "Didactic-City" gamification tool. This prioritization considered the needs and context of users of the future tool, the aforementioned was conducted through a quantitative study, applying the factor weighting method, which resorts to qualitative parameters to assess variables' performance, in this case, of types of citizen competencies. As methodological exercise, weighting intends to establish a differential valuation from an integral perspective since it helps reaching an estimation taking into consideration different parameters (which are assigned a relative weight as per the attributed importance). In this case, those parameters are qualitative since they refer to characteristics of citizen competencies. Despite being subjective, this method was applied because it allows experts in different areas to intervene, guaranteeing effectiveness and significantly decreasing subjectivity. Additionally, the Delphi method was also applied in parallel, it is a technique that collects the opinion of a group of experts through reiterated consulting. Delphi is frequently used to decrease decision's subjectivity and increase results' feasibility due to the fact that biases and limitations of a single individual

are overcome, and because the analysis is based on intersubjective judgement (Reguant-Alvarez & Torrado-Fonseca, 2016).

Information Collection Procedure

Initially, semi-structured interviews were designed and applied to five experts in citizen competencies, these resulted in conceptual and experimental information. The project's team expanded its knowledge on civic education, and several prioritization methodologies were evaluated. Afterwards, five focus groups were assembled, each with a moderator to direct the session, and solved additional needs pertaining topics or procedures, in order to avoid hindering the fulfillment of the objectives (Ecker, 1997). In each group, a discussion on a particular topic was generated, then, each student had to individually provide a quantitative appreciation of the factor's specific aspects that the focus group was evaluating. Thus, a combination of individual scores led to the final results, the main input of the weighting process.

Participants

The focus groups were made up of 21 experts and the semi-structured interviews were answered by five experts. These included: directors of research groups and laboratories of educational innovation, experts in civic education, members of the group of advisors who produced citizen competencies' standards for Colombia, the academic vice rector of a higher education institution, among others.

Information Analysis Method

It is important to clarify that the prioritization includes only cognitive, emotional and communicative competencies, since, as indicated by Chaux, Lleras, Velasquez and Mejia (2004), the development of conciliatory competencies entails the application of the other competencies. The methodology was divided in five stages: (1) definition of factors relevant for the project based on a preliminary review of the literature and taking into account the results of the expert interviews; (2) allocation of weight to each factor; (3) evaluation of each type of citizen competency in each factor through focus groups following the Delphi method or considering findings of studies in literature; (4) execution of the prioritization matrix; and (5) analysis of quartiles. Furthermore, this methodology was validated by two experts in citizen competencies in the university context who took part in planning the activity, conducting a simulation and providing feedback to the process.

RESULTS

Definition of Factors That are Relevant for the Project

According to what has been found in the literature and considering the points of view of experts in citizen competencies who were interviewed, the following factors were defined:

Factor 1. Difficulty to Gamify Each Type of Citizen Competency.
It is important to guarantee that the selected competencies can be
gamified and incorporated into a virtual scenario. Incidentally, some
types of citizen competencies have more tangible perceptions than
others (Norman-Acevedo, 2019). For instance, in the category of
cognitive competencies, critical thinking is rooted in disciplines such
as philosophy and psychology, sciences that are mostly related with
mental processes (Lewis & Smith, 1993); while knowledge, as per
Bloom's taxonomy, is related with basic skills that respond to theoretical
fundamentals, concepts or principles. Finally, multiple perspectives are
part of higher level thinking skills concerning analysis, synthesis and
evaluation (Kennedy, Fisher, & Ennis, 2010). This way, it is possible to
observe how types of citizen competencies, even in the same category,
respond to completely different mental processes, which is why some
seem to be more subjective than others, adding difficulty to the
gamification process in a digital tool.

**Factor 2. Difficulty to Develop Each Type of citizen competency in
Daily Life.** Citizen competencies give students the capacity to think
for themselves, acknowledge their actions and express their opinions
firmly and respectfully, adding to the debate, fulfilling its agreements,
proposing, understanding and respecting its rules (Ministerio de
Educacion Nacional de Colombia, 2004). According to Mockus (2004),
being a citizen requires skills, knowledge, attitudes and collective habits
that are shaped by families, neighborhoods and school, environments of
daily life. Therefore, it is very important to foster this type of skills on a
daily basis, as professed by the learning by doing model, practice is the only
way to develop a skill (Felder & Brent, 2003). Thus, this factor analyses
internal and external elements that aid fostering some types of citizen
competencies with more or less difficulty, and through which its daily
development decreases or increases. More relevance will be given to those
competencies that show greater difficulty to be developed in daily life,
with the aim of having the gamification tool nurture less developed skills.

**Factor 3. Importance of Developing Each Type of citizen competency
in Virtual Higher Education.** Training in citizen competencies is
relevant at all ages, yet it is specifically important in higher education,
as per the Political Constitution of Colombia, this is a constitutional
matter that must be considered in a citizen-driven democracy. Therefore
education of quality implies not just training in disciplinary issues,
it comprises comprehensive training as humans based on values and
principles necessary to live in community and contribute to society's
robustness (Alba & Padilla, 2016). Additionally, the study of this
dynamic in the context of virtual education entails recognizing the

modality's specific characteristics, since, in most cases, virtual learning environments hinder or promote the development of some citizen competencies over others (Litwin, 1993). Accordingly, this study intends to give more relevance to the most pertinent types of citizen competencies for virtual education students in order to fulfill their needs and enhance their performance.

Factor 4. Effectiveness of Gamification to Develop Each Type of citizen competency. Gamification is an alternative solution to traditional educational methodologies, which are perceived by students as boring and ineffective. This new proposal motivates, increases commitment and strengthens students' knowledge while offering entertainment (Katsaounidou, Vrysis, Kotsakis, Dimoulas, & Veglis, 2019). However, gamification is relatively new, its first documented use was in 2008, which is why some authors are skeptical about its effectiveness (Kim, 2015). Additionally, research has proven the advantages of gamification on an increase in factors such as motivation, but in many cases, it has not been enough to expand knowledge of a topic in particular; this evinces variations over the impact of ludic exercises due to the topic addressed. Consequently, giving more relevance to the types of citizen competencies effectively developed through gamification is very significant for this research.

Allocation of Weight to the Factors

To allocate weight to each of the aforementioned factors, focus groups followed the Delphi method, these were made up of experts in pedagogy, psychology and teaching, as well as researchers and software developers. The weights were generated based on a sum equal to one and its allocation was largely dependent on the evaluators' criteria and experience (Carro & Gonzales, 2012). In this session, participants were familiarized with the objectives of the Didactic-City project as theoretical foundation of the citizen competencies being considered. Experts discussed the weight that needed to be allocated to each factor according to their knowledge and experience, afterwards, each one allocated their own weight to each factor. The compilation and consolidation of the data led to the results illustrated in Table 2.

Factor	Weight
Difficulty to gamify each type of citizen competency	24,0%
Difficulty to develop each type of citizen competency in daily life	22,5%
Importance of developing each type of citizen competency in virtual higher education	23,5%
Effectiveness of gamification to develop this type of citizen competency	30,0%
Total	100%

Table 2.
Results of allocation of weight to the factors.
Source: compiled by the authors.

Evaluation of Each Type of citizen competency in Each Factor

Considering that the proposed factors are of qualitative nature, to allocate a weight to each of the factors' type of citizen competency, evaluations for factors 1, 2 and 3 were produced by the focus groups; while a research found in the literature was used for factor 4.

For the evaluation of factor 1, a prioritization workshop was executed with a focus group made up of five experts in programming who specialized in creating videogames or gamification tools. This group of people valuated the types of citizen competencies according to the scale in Table 3, taking into account experience and the debate's discussions.

Score	Scale
5	Very easy
4	Easy
3	Indifferent
2	Hard
1	Very hard

Table 3.
Scale of factor 1: gamification difficulty.
Source: compiled by the authors.

The results of this exercise are consolidated in Table 4. According with participants' arguments, gamification of emotional competencies is very difficult because these imply direct contact with people and the Internet acts as a barrier between the real and virtual world, support for this fact can be found in the literature (Carpena, 2016; Hine, 2000). Likewise, gamification of oral language is considered difficult because orality in virtual media depends on the online social dialectic culture, in which different factors intervene at different levels, which in turn, significantly differ from orality used in physical environments (Morales Campos, 2012). On the other hand, gamification of cognitive competencies related to knowledge is considered easy because gamification in itself has the trait of increasing users' motivation, decreasing the cognitive effort that comes

with acquiring new knowledge (Villalustre Martinez & Del Moral Perez, 2015).

TYPES OF CITIZEN COMPETENCIES		Score
Cognitive	Knowledge	5
	Argumentation	4
	Multiple perspectives	2
	Systemic thinking	2
Emotional	Empathy	1
	Managing emotions	1
Communicative	Oral	2
	Written	4

Table 4.
Results of factor 1: gamification difficulty.
Source: compiled by the authors.

In terms of the evaluation of factor 2, a prioritization workshop was executed with a focus group made up of four experts in pedagogy and psychology, which allocated a score to each of the citizen competencies following the scale in Table 5.

Score	Scale
5	Very important
4	Important
3	Indifferent
2	Slightly important
1	Not important at all

Table 5.
Scale of factor 2: difficulty to develop in daily life.
Source: compiled by the authors.

Results obtained after consolidating the evaluations of the focus group are illustrated in Table 6, these evince the use of contexts proposed by the Gestalt. During the debate, participants emphasized on the importance of communicative skills in the virtual environment based on its academic implications and on the man/machine relationship, which have questioned cyberspace's aptness to develop these skills (Daiute, 2000). In that sense, Cochran-Smith, (1991) assert that in digital media, students of all ages regard writing as a highly motivating factor, since writing in cyberspace encompasses playing with knowledge, identity and language; this has not been reported in traditional learning environments.

		Context with: ...			
		...oneself	Others	Environment	Average
Cognitive	Knowledge	4	3	4,6667	3,888889
	Argumentation	4	3	4,6667	3,888889
	Multiple perspectives	4	3	4,6667	3,888889
	Systemic thinking	4	3	4,6667	3,888889
Emotional	Empathy	5	5	5	5
	Managing emotions	5	5	5	5
Communicative	Oral	4	4,6667	5	4,555556
	Written	4	4,6667	5	4,555556

Table 6
Results of factor 2: difficulty to develop in daily life.
Source: compiled by the authors.

Similarly, the evaluation of factor 3 considered the contexts in which citizen competencies are developed, as per the Gestalt. Four professional experts in education with experience working with young university students participated in this focus group. The allocation of the score was defined by the scale introduced in Table 7.

Score	Scale
5	Very important
4	Important
3	Indifferent
2	Slightly important
1	Not important at all

Table 7
Scale of factor 3: importance in virtual higher education.
Source: compiled by the authors.

The final results appear in Table 8. According to the experts, nowadays it is easier to acquire civic knowledge in one's context because there are diverse mechanisms in place to independently learn about this topic; e.g., tutorials, documents and virtual courses on the Internet, as well as different books on constitutional law. Moreover, it is easy to do it in other people's context, in Colombia, instruments exist to steer education in these topics and different lectures have been developed due to the State's effort to demand educational institutions training in citizen competencies, as explained in Article 41 of the Political Constitution: "Each educational institution, official or private, will teach Constitution and Civic Instruction". On the contrary, acquiring said knowledge in connection to the environment has a greater degree of difficulty.

		Context			
		Oneself	Others	Environment	Average
Cognitive	Knowledge	2	2	4	2,66666667
	Argumentation	2	2	2	2
	Multiple perspectives	5	5	5	5
	Systemic thinking	5	5	5	5
Emotional	Empathy	1	1	1	1
	Managing emotions	2	4	3	3
Communicative	Oral	2	3	3	2,66666667
	Written	5	2	4	3,66666667

Table 8.
Results of factor 2: importance in virtual higher education.
Source: compiled by the authors.

On the other hand, participants believe argumentation is a competency that can be easily developed in all of the contexts because it is evaluated in the educational sphere through written tests, graphs, essays, research logs, portfolios, among others, which mostly require students to generate discussions and argue their stances (Observatorio de Innovacion Educativa, 2016). In terms of multiple perspectives, experts regarded it as difficult to develop, as per their experience, it is very complex for young students to analyze problems from different points of view because their individual identity is yet to be adapted to a group identity and "identity is significantly modified depending on where the observer stands: the strictly individual level or its opposite, the collective or social level" (Lopez & Ines Rodriguez, 2014).

Participants in this focus group highlight that emotional competencies are important for personal development and specify that nowadays, these competencies are trending in youth education (see Figure 1), in which multiple programs aimed at teaching these topics have emerged. This event is linked with the fact that research shows knowledge in itself is not enough to make citizens act appropriately in the quest for a specific goal (Acosta-medina et al., 2019).
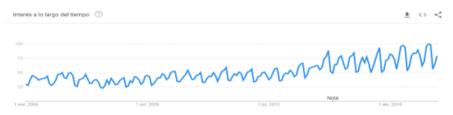

Figure 1.
Interest in emotional competencies throughout time.
Source: adapted from Google Trends.

Furthermore, experts thought written competencies were easily developed in connection with others but difficult to develop with the environment and oneself, the process to develop these competencies

requires accompaniment throughout (Scheuer, de la Cruz, Huarte, Caino, & Pozo, 2001).

Finally, the evaluation of factor 4 was based on research conducted by Universidad de Magdalena, Colombia, which evaluated the effectiveness of the use of ludic pedagogical practices, e.g., games and case studies, in the development of citizen competencies. In that study, Zambrano (2018) conducts statistical analyses on pre and posttests taken by an experimental group (students who took ludic subjects) and a control group (students who took master classes). Results are presented in Table 9 through an inference analysis conducted with Anova, using a general lineal model in which the dependent variable corresponds to types of citizen competencies, while independent variables are the ludic pedagogical practices versus master class practices.

Citizen Competencies	Control Group	Experimental Group	F	P
Citizen actions	14,64	16,67	8,27	0,00
Environment	40,87	49,17	26,91	0,00
Emotions	36,66	40,75	6,87	0,01
Empathy	37,00	38,34	0,87	0,35
Critical thinking	19,00	20,87	7,42	0,00

Table 9.
Results of the research (Zambrano, 2018).

Based on the previous results, a scale was defined according to the minimum and maximum values of the F value (see Table 10). The relationship between scale and score was established considering that a sufficiently large F value indicates that the term is significant, meaning, the greater the F value the greater the impact of the constructive pedagogical practices on students.

Score	Scale: F value
5	21.702 – 21.91
4	16.494 – 21.702
3	11.286 – 16.494
2	6.078 – 11.286
1	0.87 – 6.078

Table 10.
Scale of factor 4: ludic effectiveness.
Source: compiled by the authors.

This scale made it possible to classify and score each type of citizen competency, as seen in Table 11. These findings reveal that emotional competencies are difficult to develop through ludic practices because of their flexible nature, and that they are dependent on large amount of factors including: relationship with others, each person's environment and education, consequently, answers vary depending on the individual

and his/her personal circumstances. On the contrary, pedagogical strategies that incorporate gaming elements manage to create a learning environment that eases transmission and acquisition of new topics, with cognitive competencies of knowledge or written and oral skills being very effective to develop (Zambrano, 2018).

Type of citizen competency		Score
Cognitive	Knowledge	5
	Argumentation	2
	Multiple perspectives	2
	Systemic thinking	2
Emotional	Empathy	1
	Managing emotions	2
Communicative	Oral	5
	Written	5

Table 11.
Results of factor 4: ludic effectiveness.
Source: compiled by the authors.

Calculation of the Prioritization Matrix

To obtain the total score per type of citizen competency, the information compiled in previous stages was condensed and the score of each factor's citizen competency was multiplied by its weight. Thus, the addition of each factor's score in each type of competency leads to the final score, as seen in Table 12.

Factor	Weight	Type of citizen competency							
		Cognitive				Emotional		Communicative	
		Knowledge	Argumentation	Multiple perspectives	Systemic thinking	Empathy	Managing emotions	Oral	Written
1	24%	5,00	4,00	2,00	2,00	1,00	1,00	2,00	4,00
2	23%	2,67	2,00	5,00	5,00	1,00	3,00	2,67	3,67
3	24%	3,89	3,89	3,89	3,89	5,00	5,00	4,56	4,56
4	30%	5,00	2,00	2,00	2,00	1,00	2,00	5,00	5,00
Total		4,21	2,92	3,12	3,12	1,94	2,69	3,65	4,36

Table 12.
Prioritization Matrix.
Source: compiled by the authors.

Analysis of Quartiles

The statistical software Minitab 18 and an analysis of quartiles aided the organization of types of citizen competencies according to their final

score (see Table 13). These results allow to conclude that written and communicative competencies and cognitive of knowledge will have more importance in the "Didactic-City" gamification tool because they got the highest score in this exercise.

Competencies	Score	Quartiles
Communicative written	4,35556	Q1
Cognitive-knowledge	4,21389	Q1
Communicative oral	3,65056	Q2
Cognitive-systemic thinking	3,11889	Q3
Cognitive-multiple perspectives	3,11889	Q3
Cognitive-argumentation	2,92389	Q3
Emotional-managing emotions	2,69000	Q4
Emotional-empathy	1,94000	Q4

Table 13.
Quartile analysis.
Source: compiled by the authors.

CONCLUSIONS

Citizen competencies are fundamental skills for the development of citizens, thus, they have gained the interest of governmental institutions and -clearly- of educational institutions as its training translates into benefits for communities. Therefore, academia has studied and applied diverse methods of social appropriation of this type of knowledge, especially in young people, however, few strategies focus explicitly on virtual education. As it was observed, this modality has various limitations, so studying this particular context is of great interest. This research prioritized a set of citizen competencies, in order to include competencies in the top quartiles in a gamification-based, motivational and didactic tool. Communicative and cognitive citizen competencies were the most relevant in this context of gamification and virtual education. This is connected with the significance of communicative skills in information and communications technology (ICT), as well as with the importance of cognitive competencies in university as these prepare students to adapt to changes in knowledge society (Sanz, 2010). On the other hand, it is clear that prioritization is a useful tool to assist decision-making processes because it helps to focus attention on particular factors, improving the task at hand. In that regard, it is indispensable to base the analyses on technical methodologies, even when engaged in qualitative considerations, in order to considerably increase the decision's objectivity. In this research, the application of factor weighting and Delphi methods was essential to lessen subjectivity based on experts'

criteria and to increase results' reliability to the extent that a single individual's bias and limitations were overcome, and that the analysis was based on intersubjectivity. Finally, further research should consider that, although the methodology in the research herein is applicable to other areas of knowledge, it must be adapted to the study's particular context because in this case, factors selected are highly related to the target population and to the media in which the "Didactic-City" gamified tool will be developed.

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