ILCODI TEST OR HOW TO MEASURE THE PERCEPTIONS OF SECONDARY SCHOOL TEACHERS ABOUT THE USE OF VIDEO GAMES IN THE CLASSROOM

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Abstract

The development of digital society has led to the incorporation of a series of technological tools, some of which are classed as emerging tools, into classroom dynamics to bring education closer to the daily lived reality of the students. This paper presents the data collection tool developed as part of the ERDF project entitled "Design of achievement indicators for digital competency mediated by emerging technologies among secondary school students" (1380801 -R), which aims to find out teachers' perceptions about the value of video games as a resource to support student learning.

Keywords: *Video games, Compulsory Secondary Education, expert opinion*

1. INTRODUCTION

The advancement of Information and Communication Technologies (ICT) in today's society is undeniable. This has led to the introduction of emerging technologies within education with the aim of improving the educational process for students (Durrall et al., 2012). These technologies can be defined as those that "cause radical change in business, industry or society" (Halaweh, 2013, p. 2). They can also be understood as the tools or processes of innovation that are used in various educational settings to achieve different purposes related to education (Velestsianos, 2010).

In this sense, these technologies mark trends in society and represent a challenge and an innovation in the field of education, causing great impact. This type of technology encompasses Gamification. The Horizon Report of 2011 (Durrall et al., 2012) indicated that gamification processes would have a strong presence in classrooms within five years. Ten years later, the predictions made in this report have been borne out, and gamification is becoming more and more important, as the publications show, both in terms of research and educational innovation (Ahmad et al., 2015; Al-jifri & Elyas, 2017; Arufe-Giráldez, 2019; Bossolasco et al., 2015; López & Rodríguez, 2016; Marín-Díaz et al., 2019).

These innovations in pedagogical and methodological processes are changing the way we access knowledge and how it is presented in the classroom, which requires, as established by Sein-Echaluce et al. (2017), the use of innovative or transformative methodologies that facilitate the improvement of learning outcomes among students. Within compulsory secondary education, when students are aged 12 to 16, Herrada and Baños (2018) establish the urgent need to apply fresh new strategies, on account of the age of these students, conditioned by their consideration of reality and the development of their own identity (Husillos, 2017; Meeus, 2016). This is our starting point when working with adolescent students, and teachers must modify their planned actions to make sure that students are learning efficiently, by approaching different areas of knowledge in a cross-cutting and dynamic way (Landoy et al. 2019). The baseline level of competence must be taken into account to adapt to the required learning paces and styles (Espinar and Moya, 2019). Students' self-image must be stimulated and promoted along with their capacity (Boyadzhieva, 2016; Luna, 2015), working to develop their reflection and critical thinking skills (Suárez-Valenzuela & Suárez-Riveiro, 2019), underscoring the usefulness of what they are learning through student engagement, experimentation, and motivation (Boekaerts, 2010), and using technologies as cross-cutting tools in the curricula (Ramirez et al. 2016).

All these considerations create a working scenario where the integration of emerging technologies shapes the educational proposal of teachers, adopting the use of active methodologies (Bano et al., 2018). Within this wide range of possibilities, game-based learning is a method that is playful, engaging, and motivational (Montero, 2017), which includes the use of digital games or video games as a didactic resource and pedagogical practice (Acosta-Cipagauta and Bernal-Gómez, 2019). Gamification is

introduced within this category of active methodologies as an emerging technology that, through the use of game elements, is applied to non-gaming contexts (Dias, 2017), such as education. However, as determined by Kapp (2012), the use of this method requires a number of skills and prior planning by teachers for it to acquire educational potential.

This educational potential is characterised by the development of creativity (Frossard et al., 2015), the capacity to solve problems (Hakak, et al., 2019), mental processes of reflection and motivation (Ruiz-Ariza et al., 2018), the implementation of social skills (Cejudo et al., 2019) and work on different emotional aspects (Cabello et al., 2019).

In addition to this, the benefits of using this resource must be addressed from a didactic perspective at this stage of education. Specifically, the research carried out by Acquah and Katz (2020) shows the positive impact of using video games on learning and communicative interaction in a second language (English). Serna-Rodrigo (2020) concluded that the use of certain video games facilitates the learning of Spanish language and literature. Marin (2016) states that this way of working in the classroom facilitates the inclusion of all students in the classroom and allows for the inclusion of cross-cutting content or content related to a values-based education and effective equality between men and women (Hosein, 2019; Navarro-Pérez et al., 2019).

In light of the existing research, educational legislation itself, specifically Decree 111//2016, of 14 June, which establishes the organisation and curriculum of compulsory secondary education in Andalusia, places a firm emphasis on using active methodologies to contextualise the education process, presenting contents in an interrelated way and promoting project-based learning, facilitating student engagement, experimentation, and motivation, which makes learning more functional and increases the possibilities of transferring that learning. In turn, the new Royal Decree 217/2022, of 29 March, which regulates and establishes minimum teaching content for compulsory secondary education, explores this issue in greater depth, underlining "the need to foster competence-based, independent, meaningful, and reflective learning in all subjects" (p. 41571). Along these lines, this Royal Decree points out the need to address digital competence, understood as "that which implies the creative, critical, and safe use of information and communication technologies in order to achieve the objectives related to work, employability, learning, use of free time, inclusion, and participation in society" (Order ECD/65/2015, p. 6995).

This competence is split into five elements: information, communication, content creation, safety, and problem solving, all of which can be approached through educational gamification, as Hurwitz and Schmitt (2020) argue.

In this same vein, the Organisation for Economic Co-operation and Development (OECD, 2019) stresses the obligation to address the promotion of digital skills for the future of societies, stating that these skills, in education, should be projected through experiences that include emerging technologies.

We cannot forget, however, that the development of any competence occurs through the design of cross-cutting subjects and activities. This paper focuses on the core subjects of Spanish Language and Literature, Mathematics, and Foreign Language Learning, present throughout secondary education, since these make a significant contribution to the acquisition of the basic elements of culture, preparation for academic transition and employment, and training for life in society as citizens. The subject of Spanish Language and Literature contributes to the development of digital competence by addressing the aspects of information, communication, and safety. Mathematics, in the way it is approached in the first few years, and later in its academic or applied options, provides elements for the development of problem solving and content creation, which are typical of this competence. Foreign language learning promotes this competence by developing tasks that involve information, communication, and security. These subjects can be addressed more effectively and efficiently through active methodologies involving the use of emerging technologies for the development of digital competence, which requires its own model of evaluation that is consistent with and adapted to the social demands of the 21st century.

For all these reasons, the paper presented here is part of the European ERDF project entitled "Design of achievement indicators for digital competence mediated by emerging technologies among secondary school students" (1380801-R), showing the process followed to construct and validate, by means of a

panel of experts, a data collection instrument that aims to find out the perceptions of teachers about the value of video games as a resource to support student learning.

2. MATERIALS AND METHODS

This work has followed a descriptive and correlational non-experimental research design. We chose a questionnaire to gather basic information about the project's pursued outcomes.

We created an ad hoc questionnaire because the existing scientific literature does not provide a tool that is suitable for our research goals. We followed the steps described below to ensure the correct development of the questionnaire:

- Step 1. Provisional questionnaire. A draft questionnaire was designed on the basis of the problem formulated and the objectives pursued. A Likert-type scale was used, composed of a set of items presented in the form of statements or judgements to which the target participants had to react.

- Step 2. Validation of the questionnaire. To guarantee the scientific soundness of this instrument, a validation process was conducted using a panel of experts to validate the contents of the tool through a table of specifications, asking the experts to rate the pertinence and clarity of the items included. The aim of this process was manifold: to corroborate the pertinence of the answers given by the teachers, to show their level of understanding of the terminology presented in the questionnaire, and to observe any difficulties encountered when applying the questionnaire, as well as the duration of the questionnaire.

This tool originally included a total of 38 items, distributed into three analytical dimensions: identification details, video game usage, and use of video games in the secondary education classroom. Answers were given on a five-point scale, where 1 means strongly disagree and 5 means strongly agree.

3. RESULTS

Having constructed the first draft of the instrument, it then had to be validated. Validity is understood to be “the degree to which the measure accurately reflects the trait, characteristic or dimension it sets out to measure” (Del Rincón et al., 1995, p. 74). In short, validity refers to what the test measures and this can be of various types depending on the objective pursued. In this case, content validity was applied since, as Pérez Juste notes (1986, p. 227), it “determines the degree to which each of the persons who carry out the same test possesses the trait defined by it, which implies the possession of a theoretical rather than empirical dimension”. The procedure used was an expert panel (Ruiz, 2008). Rather than being expressed in a quantitative way by means of an index or coefficient, it is estimated through the generally subjective or intersubjective judgement of experts in the subject at hand.

This technique seeks to obtain the opinion of people whose training or career path reflect their capacity to issue critical evidence and evaluations on the relevant subject (Escobar and Cuervo, 2008), which provides validity to the content by seeking rational consensus.

Identifying and selecting panel members is a crucial element in the application of this technique. Skjong and Wentworth (2000) suggest that the following should be taken into account: experience in making judgements and decisions based on the available evidence; their reputation in the community; their willingness and motivation to participate; as well as their impartiality, their ability to adapt, and their self-confidence. Hora (2009) points to other factors such as the research carried out on the topic, citations of their work and publications of impact, and recognition by bodies or institutions, as criteria to take into account when choosing experts.

The panel comprised 12 experts from higher education institutions (75%), secondary schools (16.66%) and teacher training centres (8.33%). 66.7% are men and 33.4% are women. The majority (83.34%) are from Spain (Cordoba, Malaga, Huelva, Salamanca and Bilbao), with 16.66% from schools in Latin America (Mexico and the Dominican Republic).

In order to identify more effectively the expertise of these people in the subject at hand, we estimated the Expert Competence Coefficient (K), an index that estimates the experts' own perceived level of knowledge on the subject analysed (Kc), as well as the sources that enable them to argue their decision (Ka) (Cabero and Llorente, 2013). The data provided by Table 1 show high values (>.8) for 7 of the 12 participants (58.3%), with intermediate values (>.6) for the rest (41.7%) indicating a high level of expertise. This endorses their presence on this panel and the usefulness of their contributions in constructing the instrument used in this research.

Expert	Kc	Ka	K	Assessment
1	.90	1	1	High
2	.70	1	.9	High
3	.80	.9	.9	High
4	.60	1	.8	High
5	.75	.7	.7	Medium
6	.75	1	.9	High
7	.90	1	1	High
8	.40	.8	.6	Medium
9	.80	.6	.7	Medium
10	.75	1	.9	High
11	.60	.6	.6	Medium
12	.60	.6	.6	Medium

Table 1. Expert competence coefficient of the panel members.

Source: Authors' own.

Taking as a reference the studies of Skjong and Wentworth (2000) and Escobar and Cuervo (2008), the analytical process involved sending an e-mail invite to the group to take part in this stage of the research. The procedure involved assessing each of the 31 items, assigning a numerical score between 1 and 5 (where 1 is the lowest score and 5 is the highest), depending on their pertinence (correspondence between the content of the item and the dimension for which it is being used) and their clarity (degree to which the item is precisely worded, facilitating its understanding by the survey participants). In addition, in a section entitled "Comments/Alternative Wording" associated with each of the three dimensions to be assessed, the experts were able to offer their own input and suggestions in this regard and to propose alternative ways of formulating or wording items which they considered inappropriate because of their lack of clarity or pertinence (see annex 1).

Having estimated the central tendency and dispersion statistics for each of the two valuation units (see Table 2), the results yielded values greater than 4.08 for the pertinence of all the items, and greater than 4.25 for their clarity. To obtain values that can be statistically contrasted based on the expert opinion of the panel members, Aiken's V coefficient was obtained for each item. The formula devised by Penfield and Giacobbi (2004) has been used to calculate this, which makes decisions based on a confidence interval determined by the research team (n.s.=.05, Rodriguez's criterion, 2015) and allows us to exclude items whose coefficient is less than V=.50 (Cicchetti's criterion, 1994). The results show that all the values referring to pertinence are greater than .73 and in the case of clarity they are all above .81, showing that the test offers sufficient validity for implementation.

Items evaluated	**Pertinence**			**Clarity**		
	Mean	**SD**	**V**	**Mean**	**SD**	**V**
Do you regularly play video games in your free time?	4.42	1.240.85		4.83	0.577.96	
If so, please indicate when you play video games.	4.08	1.564.77		4.83	0.389.96	
Please indicate how many hours a week you spend playing video games.	4.33	1.231.83		4.58	1.165.89	
What devices do you use to play games?	4.42	1.240.85		4.67	1.155.92	
The use of video games in the classroom favours an active methodology.	4.67	0.651.92		4.33	0.985.83	
The use of video games in the classroom favours a participatory methodology.	4.75	0.452.94		4.50	0.798.87	
The use of video games in the classroom favours a communicative methodology.	4.58	0.793.89		4.33	1.073.83	
The use of video games in the classroom allows the principles of universal design to be applied to learning.	3.92	1.084.73		4.25	0.866.81	
The use of video games facilitates the development of learning situations.	4.50	0.798.87		4.42	0.900.85	
The use of video games in the classroom favours the development of key competences.	4.75	0.452.94		4.50	0.798.87	
The use of video games in the classroom favours the achievement of learning goals in the subject in which they are used.	4.50	1.000.87		4.42	0.793.85	
The use of video games in the classroom facilitates the cross-sectional learning of content.	4.58	0.793.89		4.67	0.651.92	
The use of video games in the classroom facilitates a comprehensive education for students.	4.25	1.055.81		4.58	0.793.89	
The use of video games in the classroom facilitates group work.	4.83	0,389.96		4.73	0,647.93	
The use of video games in the classroom helps students to carry out complex tasks associated with real-world situations related to the subject in which they are used.	4.33	0.985.83		4.33	1.231.83	
The use of video games in the classroom favours the development of emotional intelligence.	4.25	1.288.81		4.33	1.557.83	
The use of video games in the classroom favours a critical approach among students.	4.67	0.778.92		4.50	1.168.87	
The use of video games in the classroom promotes a critical approach among students.	4.25	1.288.81		4.83	0.389.96	
The use of video games in the classroom promotes creativity among students.	4.55	0.820.89		4.45	0.820.86	
The use of video games in the classroom promotes interaction among students.	4.82	0.603.95		4.73	0.647.93	
The use of video games in the classroom promotes intercultural education.	4.73	0,467.93		4.73	0.647.93	
The use of video games in the classroom promotes a values-based education	4.58	0.996.89		4.67	0.888.92	

The use of video games in the classroom promotes reading comprehension among students.	4.67	0.651.92	4.67	0.888.92
The use of video games in the classroom promotes oral expression among students.	4.42	0.996.85	4.67	0.888.92
The use of video games in the classroom promotes written expression among students.	4.25	1.138.81	4.67	0.888.92
The use of video games in the classroom promotes the development of students' ability to debate and express themselves in public in the Spanish language.	4.50	0.798.87	4.67	0.888.92
The use of video games in the classroom promotes the development of students' ability to debate and express themselves in public in a foreign language.	4.42	0,900.85	4.67	0.888.92
The use of video games in the classroom promotes the prevention of bullying.	4.33	1,371.83	4.58	1,165.89
Students are able to easily use video games in the classroom.	4.67	0.888.92	5.00	0,000 1
Computer and/or programming skills are required to use video games in the classroom.	4.17	1.403.79	4.83	0.577.96
I believe that the use of video games in the classroom is significant for student learning.	4.67	0.651.92	4.50	1.243.87

Table 2. Analysis of the pertinence and clarity of the instrument.

Source: Authors' own.

We also understand that the number of items included is sufficient (mean=4.67, SD =.492) and relevant to respond to the objectives pursued in the study (mean=4.58, SD=.669).

4. DISCUSSION AND CONCLUSIONS

In light of the results obtained, the expert panel technique has made it possible to validate all the competences designed from three aspects: the pertinence of the notion of competency for the dimension assigned; clarity in the definition of competency, and gaining the expert opinion of the panel to reformulate some of the competencies or include others that are necessary to obtain information on the perceptions of secondary school teachers about the use of video games in the classroom.

When using these kinds of content validity techniques, there are certain aspects, as indicated by Escobar and Cuervo (2008), that cannot be controlled by the researcher, including the difficulty of the task. Mastering the procedure and creating an appropriate context that facilitates the generation of information is usually sufficient to make sure the margin of error and the reliability of the test remain unchanged. However, one of the limitations encountered is the difficulty gaining access to experts. This is not so much in terms of knowing who such experts are, since their expertise is endorsed by their research and publications, but due to the added problem of interfering in their professional lives and having to engage them with this type of research that is a draw on their time and effort. Taking this consideration into account could help researchers when selecting the right method to secure expert judgement.

The information collected in this questionnaire must take account of a number of factors that guarantee its scientific veracity and do not compromise the study (Nunnally & Bernstein, 1994); it must be reliable and valid, consistent over time, and make contributions relating to the construct measured: the perceptions of secondary school teachers about the use of video games in the classroom. That is why,

before using the questionnaire for this purpose, a pilot study will be carried out with secondary school teachers in Andalusia (Spain), which will allow us to refine the instrument.

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REFERENCES

1. Acosta-Cipagauta, C y Bernal-Gómez, M 2019, "Aplicación de los videojuegos en el ámbito educativo", *Revista Vínculos: Ciencia, Tecnología y Sociedad, vol. 16, no.*1, pp. 82-87. Doi: https://doi.org/10.14483/2322939X.15465.
2. Acquah, E y Katz, H 2020, "Digital game-based L2 learning outcomes for primary through high-school students: A systematic literature review", *Computers & Education*, *vol. 143*, pp. 1-19. Doi: https://doi.org/10.1016/j.compedu.2019.103667.
3. Ahmad, I, Jaofor, A, Iskandar, MF, & Makina, T 2015, "Users' experience in role-playing game: Measuring the player's gameplay experience", *Journal Teknologi*, vol. *77, no.*19, pp. 45-48. Doi: https://doi.org/10.11113/jt.v77.6512.
4. Al-jifri, AA, & Elyas, T 2017, "The Impact of Video Games in the Acquisition of English Language: The Case of Saudi Youths", *Journal of Foreign Language Education and Technology, vol. 2, no.* 2, pp. 15-35.
5. Arufe-Giráldez, V 2019, "Fortnite EF, un nuevo juego deportivo para el aula de Educación Física: propuesta de innovación y gamificación basada en el videojuego Fortnite", *Sportis*, vol. *5, no.* 2, pp. 323-350.
6. Bano, M, Zowghi, D, Kearney, M, Schuck, S y Aubusson, P 2018, "Mobile learning for science and mathematics school education: A systematic review of empirical evidence", *Computers & Education,* vol. 121, pp. 30-58. Doi: https://doi.org/10.1016/j.compedu.2018.02.006.
7. Boekaerts, M 2010, "The crucial role of motivation and emotion in classroom learning". En H Dumont, D Istance y F Benavides (eds.), *The nature of learning. Using research to inspire practice* (pp.91-111). Paris: OECD. Doi: https://dx.doi.org/10.1787/9789264086487-en.
8. Bossolasco, ML, Enrico, RJ, Casanova, BA, & Enrico, EE 2015, "Kokori in serious game. La perspectiva de los estudiantes ante una propuesta de aprendizaje innovadora", *RED, Revista de Educación a Distancia, vol. 45*, *art. 3*, pp. 1-17. Doi: https://doi.org/10.6018/red/45/bossolasco.
9. Boyadzhieva, E 2016, "Learner-centered Teaching and Learner Autonomy", *Procedia-Social and Behavioral Sciences, vol. 232*, pp. 35-40. Doi: https://doi.org/10.1016/j.sbspro.2016.10.008.
10. Cabello, E, Pérez, N, Ros, A, & Filella, G 2019, "Los programas de educación emocional happy 8-12 and happy 12-16. Evaluación de su impacto en las emociones y el bienestar", *Revista Española de Orientación y Psicopedagogía, vol. 30, no.* 2, pp. 53-66. Doi: https://doi.org/10.5944/reop.vol.30.num.2.2019.25338.
11. Cabero, J y Llorente, MC 2013, "La aplicación del juicio de experto como técnica de evaluación de las tecnologías de la información (TIC)", *Revista de Tecnología de Información y Comunicación en Educación*, vol. *7, no.* 2, pp. 11-22.

12. Cejudo, J, López-Delgado, ML, & Losada, L 2019, "Effectiveness of the videogame "Spock" for the improvement of the emotional intelligence on psychosocial adjustment in adolescents", *Computers in Human Behavior*, vol. 101, pp. 380-386. Doi: https://doi.org/10.1016/j.chb.2018.09.028.
13. Cicchetti, DV 1994, "Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology", *Psychological Assessments, vol. 6*, pp. 284-290.
14. Decreto 111/2016, de 14 de junio, por el que desarrolla el currículo correspondiente a la Educación Secundaria Obligatoria en la Comunidad Autónoma de Andalucía. Boletín Oficial de la Junta de Andalucía, 122, de 28 de junio de 2016.
15. Del Rincón, D, Arnal, J, Latorre, A y Sanz, A 1995, "*Técnicas de investigación en ciencias sociales",* Dykinson.
16. Dias, J 2017, "Teaching operations research to undergraduate management students: The role of gamification", *The International Journal of Management Education, vol. 15,* pp. 98-111. Doi: https://doi.org/10.1016/j.ijme.2017.01.002.
17. Durall, E, Gros, B, Maina, MF, Johnson, L, & Adams, S 2012, "Technological perspectives: Higher Education in Latin America 2012-2017". Austin, Texas: The New Media Consortium. Viewed 20 May 2021, <http://openaccess.uoc.edu/webapps/o2/handle/10609/17021>.
18. Escobar, J y Cuervo, A 2008, "Validez de contenido y juicio de expertos: una aproximación a su utilización", *Avances en Medición, vol. 6*, pp. 27-36.
19. Espinar, E, & Moya, ME 2019, "Impact of Teaching-Learning Process for Brain". *International Journal of Health Sciences, vol. 3, no.* 1, pp. 33-40. Doi: https://doi.org/10.29332/ijhs. v3n1.304.
20. Frossard, F, Trifonova, A, & Barajas, M 2015, "Teachers Designing Learning Games: Impact on Creativity", En G Green y J Kaufman. (eds), *Video games and creativity* (pp. 159-183). Reino Unido: Elsevier.
21. Hakak, S, Mohd, N, Nizam, M, Affal, H, Hussin, N, Ahmed, E, & Imran, M 2019, "Cloud-assisted gamification for education and learning –Recent advances and challenges", *Computers and Electrical Engineering*, vol. 74, pp. 22-34. Doi: https://doi.org10.1016/j.compeleceng.2019.01.002
22. Halaweh, M 2013, "Emerging technology: What is it?", *Journal of Technology Management & Innovation, vol. 8, no. 3*, pp. 1-10. Doi: http://dx.doi.org/10.4067/S0718-27242013000400010.
23. Herrada RI, & Baños, R 2018, "Aprendizaje cooperativo a través de las nuevas tecnologías: Una revisión", *@tic. revista d'innovació educativa, vol. 20*, pp. 16-25
24. Hora, SC 2009, "Expert Judgement in Risk Analysis", *Create Research Archive, vol. 120*. https://cradpdf.drdc-rddc.gc.ca/PDFS/unc88/p529083.pdf
25. Hosein, A 2019, "Girls' video gaming behaviour and undergraduate degree selection: A secondary data analysis approach", *Computers in Human Behavior*, vol. 91, pp. 226-235. Doi: https://doi.org/10.1016/j.chb.2018.10.001.
26. Hurwitz, LB y Schmitt, KL 2020, "Can children benefit from early internet exposure? Short- and long-term links between internet use, digital skill, and academic performance", *Computers & Education, vol.* 146, pp. 1-11. Doi: https://doi.org/10.1016/j.compedu.2019.103750.
27. Husillos, ML 2017, "La publicidad como estrategia didáctica en la enseñanza secundaria obligatoria: Un caso práctico", *Thamyris, vol. 8*, pp. 91-120.
28. Kapp, K 2012, "*The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education"*. San Francisco: Pfeiffer.
29. Landoy, A, Popa, D, & Repanovici, A 2019, "*Collaboration in Designing a Pedagogical Approach in Information Literacy"*. Switzerland: Springer. Doi: https://doi.org/10.1007/978-3-030-34258-6.

30. López, S & Rodríguez, J 2016, "Experiencias didácticas con videojuegos comerciales en las aulas españolas", *Revista DIM, Didáctica, Innovación y Multimedia, vol. 33,* pp. 1-8.

31. Luna, C 2015, "El Futuro del aprendizaje 2 ¿Qué tipo de aprendizaje se necesita en el siglo XXI?", *Investigación y prospectiva en educación: contribuciones temáticas, vol. 14,* pp. 1-19.

32. Marín, V 2016, "Posibilidades de uso de la realidad aumentada en la educación inclusiva. Estudio de caso", *Ensayos, Revista de la Facultad de Educación de Albacete, vol. 3, no. 2*, pp. 57-68.

33. Marín-Díaz, V, Sampedro-Requena, B, & Mac Fadden, I 2019, "Perceived Utility of Video Games in the Learning Process in Secondary Education—Case Studies", *Sustainability, vol. 11, no. 23*, pp. 6744. Doi: https://doi.org/10.3390/su11236744

34. Meeus, W 2016, "Desarrollo psicosocial del adolescente: una revisión de modelos longitudinales e investigación", P*sicología del Desarrollo, vol. 52, no.* 12, pp. 1969-1993. Doi: https://doi.org/10.1037/dev0000243.

35. Montero, B 2017 "Aplicación de juegos didácticos como metodología de enseñanza: una revisión de la literatura", *Revista de investigación Pensamiento Matemático, vol. VII, no.* 1, pp. 75-92.

36. Navarro-Pérez, JJ, Carbonell, A, & Oliver, A 2019, "Eficacia de una app psicoeducativa para reducir el sexismo en adolescentes", *Revista de Psicodidáctica, vol. 24, no.* 1, pp. 9-16. Doi: https://doi.org/10.1016/j.psicoe.2018.07.002.

37. Orden ECD/65/2015, de 21 de enero, por la que se describen las relaciones entre las competencias, los contenidos y los criterios de evaluación de la educación primaria, la educación secundaria obligatoria y el bachillerato. Boletín Oficial del Estado, 25, de 29 de enero de 2015.

38. Organización de Cooperación y Desarrollo Económico OCDE 2019, "*Estrategia de competencias de la OCDE 2019. Competencias para construir un futuro mejor",* España: Santillana.

39. Penield, RD, y Giacobbi, PR 2004, "Applying a score conidence interval to Aiken's item content-relevance index", *Measurement in Physical Education and Exercise Science, vol. 8*, pp. 213-225. Doi: https://doi.org/10.1207/s15327841mpee0804_3.

40. Pérez Juste, R 1986, "*Pedagogía experimental. La medida en educación",* UNED.

41. Ramírez, E, Martín-Dominguez, J, & Madail, M 2016, "Análisis comparativo de las prácticas docentes con recursos TIC. Estudio de casos con profesores de Infantil, Primaria y Secundaria". *Relatec, vol. 15, no.* 1, pp. 11-29. Doi: https://doi.org/10.17398/1695-288X.15.1.11.

42. Real Decreto 217/2022 de 29 de marzo, por el que se establece la ordenación y las enseñanzas mínimas de la Educación Secundaria Obligatoria. Boletín Oficial del Estado, 76, de 30 de marzo de 2022.

43. Rodríguez, J 2015, "*Analizando la V de Aiken Usando el Método Score con Hojas de Cálculo*". Viewed 25 April 2022, <https://www.researchgate.net/publication/277556093_Analizando_la_V_de_Aiken_Usando_el_Metodo_Score_con_Hojas_de_Calculo>.

44. Ruiz, C 2008, "El enfoque multimétodo en la investigación social y educativa: una mirada desde el paradigma de la complejidad", *Revista de Filosofía y Socio Política de la Educación, vol. 8*, pp. 13-28.

45. Ruiz-Ariza, A, Casuso, RA, Suarez-Manzano, S, & Martínez-López, EJ 2018, "Effect of augmented reality game Pokemon GO on cognitive performance and emotional intelligence in adolescent young", *Computers & Education*, vol. 116, pp. 49-63. Doi: https://doi.org/10.1016/j.compedu.2017.09.002.

46. Sein-Echaluce, ML, Fidalgo-Blanco, A, & Alves, G 2017, "Technology behaviors in education innovation", *Computers in Human Behavior, vol.* 72, pp. 596-598. Doi: https://doi.org/10.1016/j.chb.2016.11.049.

47. Serna-Rodrigo, R 2020, "Posibilidades de los videojuegos en el ámbito de la Didáctica de la Lengua y la Literatura. Una propuesta de clasificación", *EDMETIC, Revista de Educación Mediática y TIC, vol. 9, no. 1*, pp. 104-125. Doi: https://doi.org/10.21071/edmetic. v9i1.12245.

48. Skjong, R y Wentworth, B 2000, "*Expert Judgement and risk perception*", Viewed 13 June 2022, <http://research.dnv.com/skj/Papers/SkjWen.pdf>.

49. Suárez-Valenzuela, S, & Suárez-Riveiro, JM 2019, "Las estrategias de aprendizaje y las metas académicas en función del género, los estilos parentales y el rendimiento en estudiantes de secundaria", *Revista Complutense de Educación, vol. 30*, no. 1, pp. 167-184. Doi: https://doi.org/10.5209/RCED.56057.

50. Veletsianos, G 2010, "*Emerging technologies in distance education*". Canada: Marquis Book Printing. Viewed 15 June 2022, https://www.aupress.ca/books/120177-emerging-technologies-in-distance-education/.