



UNIVERSIDAD DE GRANADA

**Programa de Doctorado en Ciencias Económicas y
Empresariales**

TESIS DOCTORAL

**La interpretación ambiental gamificada como
estrategia para mejorar el capital de marca de un
destino turístico y el comportamiento
proambiental de los turistas. El papel
moderador de la distancia psicológica.**

Abril, 2023

María Lina Fernández Ruano

Tutora: Ana Isabel Polo Peña

Directoras: Ana Isabel Polo Peña y Dolores María Frías Jamilena

Editor: Universidad de Granada. Tesis Doctorales
Autor: Maria Lina Fernández Ruano
ISBN: 978-84-1117-925-6
URI: <https://hdl.handle.net/10481/83050>

- **Nombre de la doctoranda:** María Lina Fernández Ruano
- **Nombre de la tutora:** Ana Isabel Polo Peña
- **Nombre de las directoras:** Ana Isabel Polo Peña y Dolores María Frías Jamilena
- **Nombre de la Tesis Doctoral:** La interpretación ambiental gamificada como estrategia para mejorar el capital de marca de un destino turístico y el comportamiento proambiental de los turistas. El papel moderador de la distancia psicológica.
- **Programa de Doctorado:** Programa de Doctorado en Ciencias Económicas y Empresariales de la Universidad de Granada
- **Departamento:** Comercialización e Investigación de Mercados de la Universidad de Granada

Editorial: Universidad de Granada. Tesis Doctorales.

Autora: María Lina Fernández Ruano

ISBN:

URI:

La doctoranda María Lina Fernández Ruano y la tutora y directora de la tesis Dra. Ana Isabel Polo Peña y la directora Dra. Dolores María Frías Jamilena garantizamos, al firmar esta tesis doctoral, que el trabajo ha sido realizado por la doctoranda bajo la dirección de las directoras de la tesis y hasta donde nuestro conocimiento alcanza, en la realización del trabajo, se han respetado los derechos de otros autores a ser citados, cuando se han utilizado sus resultados o publicaciones.

Granada, 15 de marzo de 2023

Doctoranda

Fdo.: María Lina Fernández Ruano

Tutora y Directora

Fdo.: Ana Isabel Polo Peña

Directora

Fdo.: Dolores María Frías Jamilena

El turismo del futuro debe “ir de la mano del medio ambiente y éste debe encontrar en él su principal valedor” (Pulido, 2004).

A mis hijos, Andrés y Marcelo

Agradecimientos

En primer lugar, quiero agradecer el trabajo realizado y la ayuda prestada a la Dra. Ana Isabel Polo Peña, mi tutora y directora, y a la Dra. Dolores María Frías Jamilena, mi directora. Sin ellas hubiera sido imposible llevar a cabo este trabajo, que se ha presentado, sin duda, más arduo de lo que hubiera imaginado cuando me decidí a realizarlo. Por ello, quiero también agradecer su paciencia y comprensión durante estos años. Su implicación y dedicación ha sido admirable y constante.

Además, quiero agradecer el apoyo recibido del grupo de investigación “Tourism & Advanced Research in Marketing (TOURMARKETING)” así como de los proyectos de investigación “Ministerio de Economía y Competitividad from Spain (Research Projects ECO2015-65306-R) y “Consejería de Transformación Económica, Industria, Conocimiento y Universidades de la Junta de Andalucía (Spain) (Research Project A-SEJ-462-UGR20)”.

Igualmente, quiero agradecer al Dr. Juan Saavedra González, Decano de la Facultad de Ciencias Económicas y Administrativas de la Universidad de Concepción (Chile), su colaboración durante la estancia de investigación que realicé. El intercambio de conocimientos y experiencias en temas relacionados con la tesis doctoral resultó muy fructífero.

Una parte activa de este trabajo ha sido el Dr. Francisco Peco Torres, que le ha dedicado mucho tiempo y esfuerzo a que este proyecto saliera adelante. Además, quiero agradecer la labor realizada por Javier Medina Quero, Daniel Zafra Romero y, particularmente, Antonio Jesús Cruz Rodríguez ya que se ocuparon con total dedicación del diseño informático del cuasi-experimento, eje principal de esta tesis. Sobre todo, quiero agradecer el trabajo y la ayuda prestada a Antonio Jesús Cruz Rodríguez por contar con él en un momento delicado del diseño.

Por diversas circunstancias personales, estos años han sido muy difíciles para mí, así que finalmente quiero dedicar unas palabras de agradecimiento a aquellas personas que me han acompañado en este camino. A mi familia, a mis padres y mis hermanos, a mis padres por todo el amor que me han dado y a mis hermanos por su ayuda y protección en distintas etapas de mi vida. A mis hijos, a los que no he prestado en ocasiones toda la atención que merecen y son dos personitas maravillosas de las que me siento plenamente orgullosa. A mi cuñado Paco, por todos los trámites que ha tenido que hacer en mi ausencia y que siempre ha hecho con la mejor predisposición. A mí cuñada Inma, por su apoyo en un momento especialmente difícil, nunca lo olvidaré. A mi amigo Mario, que siempre ha creído en mí. Y, en último lugar, a Melchor, mi compañero de vida, que ha padecido conmigo todas las dificultades a las que me he tenido que enfrentar estos años y siempre ha estado a mi lado.

Estancia

Para cumplir los requisitos de la normativa para la mención internacional, la doctoranda María Lina Fernández Ruano, ha realizado una estancia de investigación de tres meses en la Facultad de Ciencias Económicas y Administrativas de la Universidad de Concepción (Chile). La Universidad está comprometida con el fomento de destinos de turismo sostenible y había lanzado un proyecto denominado “Desarrollo de un modelo de ecomunidades para el fomento de destinos de turismo sustentable en la Provincia de Arauco”. Este proyecto se ejecutó, entre otros, en colaboración con la Asociación de Ecomunicipios de Suecia y el Instituto Chileno de Permacultura, la Asociación de Municipalidades de Arauco y el Servicio Nacional de Turismo. Por tanto, la estancia suponía una gran oportunidad para el intercambio de conocimientos y experiencias sobre estrategias efectivas para el fomento del turismo sostenible en los destinos turísticos.

En el último Ranking Académico Mundial de Universidades de Shanghái, la Universidad de Concepción se situó entre las cuatro mejores Instituciones de Educación Superior en Chile. En el Quacquarelli Symonds (QS) Latin America University Ranking, la Universidad de Concepción se situó en el puesto número 12 a nivel sudamericano y en el puesto número 3 en Chile.

Índice

Resumen	2
Summary.....	6
Capítulo I: Introducción	8
1.Hacia un turismo más sostenible	8
1.1.La protección del medio ambiente en la actividad turística.....	8
1.2.Un comportamiento del turista en apoyo de la sostenibilidad medioambiental	9
2.La interpretación ambiental	10
3.Una interpretación ambiental gamificada	12
3.1.Diseño de una interpretación ambiental gamificada	12
3.2.La experiencia <i>gameful</i>	13
4.Efecto de una interpretación ambiental gamificada en el comportamiento del consumidor.....	14
4.1.Efecto de una interpretación ambiental gamificada en el valor percibido y capital de marca.....	14
4.2.Efecto de la interpretación ambiental gamificada en el comportamiento proambiental de los turistas.....	15
5.El efecto moderador de la distancia psicológica	15
6. Desarrollo de la tesis y relación entre las publicaciones: aportaciones.	17
Capítulo II: Objetivos.....	22
Capítulo III: Metodología.....	26
Capítulo IV: Resultados	28
Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect.	32
1.Introduction	33
2.Literature review and hypotheses	34
2.1.Perceived self-efficacy and participation in sports or exercise	34
2.2.Gamification and its effect on perceived self-efficacy	36
2.3.The moderating effect of the socio-demographic variables of the participant	40
3.Methodology.....	43
3.1.Population and sample	43
3.2.Measurement scales	44
3.3.Analysis strategy.....	45
4.Results.....	46

5. Discussion	50
5.1. Theoretical implications	53
5.2. Implications for practitioners	53
5.3. Limitations and future lines of research	55
6. References	56
Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived value	66
1. Introduction	67
2. Literature review	68
2.1. Implementing a gamified EI program to strategically build competitiveness	68
2.2. Gamifying an EI program for tourists: Its effect on destination perceived value	68
2.3. Gamification: Holistic design and the <i>gameful</i> experience	69
2.3.1. Creating a gamified EI program for tourists based on a holistic design approach	70
2.3.2. The gameful experience from a gamified EI program	72
3. Methodology	74
3.1. Study sample and procedure	74
3.2. Participation in gamification	75
3.3. Measurement scales	77
3.4. Data Analysis	78
4. Results	78
5. Discussion of the results, conclusions, and implications	80
5.1. Practical implications, limitations, and future research directions	81
5.2. Limitations and future research directions	82
6. References	83
Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance.	90
1. Introduction	91
2. Literature review	93
2.1. Environmental interpretation and its effect on CBDBE	93
2.2. The use of gamification in environmental interpretation and its effect on CBDBE	96
2.3. The effect of psychological distance on CBDBE	100

2.4.The moderating effect of psychological distance on the effectiveness of gamified environmental interpretation in terms of CBDBE	101
3.Methodology.....	105
3.1.Sample and procedure	105
3.2.Experiment design	106
3.2.1.Independent variables.....	107
3.2.2.Dependent variable and other variables.....	109
4.Analysis of the results	110
4.1.Scale validation	110
4.2.Sample selection bias	111
4.3.Manipulation check.....	111
4.4.Concomitant variables.....	111
4.5.Testing the proposed hypotheses.....	112
5.Discussion of the results and conclusions.....	113
6.Practical implications, limitations and future research directions	116
6.1.Limitations and future research directions.....	118
7. References	119
Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance.	130
1.Introduction	131
2.Literature review	133
2.1.Environmental interpretation and its impact on tourist behavior in support of sustainable tourism	133
2.2.The effect of gamified environmental interpretation on tourists.....	136
2.3.The effect of the tourist’s psychological distance	138
2.4.The moderating effect of psychological distance on the effectiveness of gamified environmental interpretation among tourists.....	139
3.Methodology.....	142
3.1.Sample and procedure	142
3.2.Quasi-experimental design	143
3.2.1.Independent variables.....	143
3.2.2.Dependent variable and other variables.....	145
4.Results analysis	146
4.1.Scale reliability.....	147
4.2.Sample selection bias	147

4.3. Manipulation check.....	147
4.4. Concomitant variables.....	147
4.5. Testing the hypotheses	148
5. Discussion of results and conclusions.....	152
5.1. Practical implications, limitations, and potential future research directions.....	154
5.2. Limitations and future research directions	156
6. References	157
Capítulo IX: Conclusiones	168
1. Discusión de los resultados y conclusiones principales	168
2. Implicaciones para la gestión	172
3. Limitaciones del trabajo y futuras líneas de investigación	174
Capítulo X: Bibliografía	176
Anexo I: Estímulo experimental	186
Interpretación ambiental no gamificada.....	186
Interpretación ambiental gamificada.....	195
Anexo II: Cuestionario.....	210
Estudio exploratorio y pretest para la validación de la escala de experiencia <i>gameful</i>	210
Efectos de la interpretación ambiental gamificada y de la distancia psicológica en el valor percibido, el capital de marca y el comportamiento proambiental. Efecto moderador de la distancia psicológica.	211

Índice de Tablas

Resumen	2
Tabla 1. Artículos que integran la tesis doctoral	3
Tabla 2. Estructura de la tesis.....	3
Summary.....	6
Capítulo I: Introducción	8
Tabla 3. Aportaciones de la investigación recogidas en cada uno de los artículos científicos	20
Capítulo II: Objetivos.....	22
Tabla 4. Relación de objetivos propuestos por artículos	23
Capítulo III: Metodología.....	26
Capítulo IV: Resultados	28
Tabla 5. Resultados del trabajo de investigación	29

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect.	32
Table 1. Description of the sample profile.....	44
Table 2. Standardized coefficients and individual reliability of the items	47
Table 3. Individual reliability, composite reliability and variance extracted of the dimensions.....	49
Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived value	66
Table 1. Demographic profile of the final study sample.....	75
Table 2. <i>Affordances</i> designed into the gamification	77
Table 3. Variables / dimensions and their composite reliability and variance extracted.....	79
Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance.	90
Table 1. Factors that influence the effectiveness of environmental interpretation .	94
Table 2. Evolution of scholarly study of gamification.....	96
Table 3. Basic psychological needs of motivation, and <i>affordances</i> designed to satisfy those needs via a gamified experience	98
Table 4. Composite reliability and average variance extracted of the measurement scales	110
Table 5. Results of ANOVA analyses	112
Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance.	130
Table 1. Socio-demographic profile of the final sample.....	143
Table 2. Composite Reliability and Average Variance Extracted of the measurement scales	145
Table 3. ANOVA analysis results for Hypotheses 1 and 2.....	148
Table 4. ANOVA analysis results for Hypotheses 3, 4, and 5.....	150
Capítulo IX: Conclusiones	168
Capítulo X: Bibliografía	176
Anexo I: Estímulo experimental	186
Anexo II: Cuestionario.....	210

Índice de figuras

Resumen	2
Summary.....	6
Capítulo I: Introducción	8
Figura 1. Ajuste regulatorio conceptual.....	17
Capítulo II: Objetivos.....	22
Figura 2. Modelo de investigación.....	23
Capítulo III: Metodología.....	26
Capítulo IV: Resultados	28
Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect.	32
Figure 1. Proposed research model	42
Figure 2. Outline of results from the proposed research model.....	46
Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived value	66
Figure 1. Framework diagram proposed to design an EI program base on a holistic gamified approach	72
Figure 2. Proposed research model	74
Figure 3. Structure of the gamified EI program.....	76
Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance.	90
Figure 1. Research model proposed.....	105
Figure 2. Structure of non-gamified vs. gamified environmental interpretation experience	108
Figure 3. Interaction effect of environmental interpretation type and psychological distance on CBDBE.....	113
Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance.	130
Figure 1. Structure of non-gamified vs. gamified environmental interpretation experience	144
Figure 2. Interaction effect of environmental interpretation design type and psychological distance on pro-environmental learning.....	150
Figure 3. Interaction effect of environmental interpretation design type and psychological distance on pro-environmental attitude.....	151

Figure. 4. Interaction effect of environmental interpretation design type and psychological distance on pro-environmental behavior	151
Capítulo IX: Conclusiones	168
Capítulo X: Bibliografía	176
Anexo I: Estímulo experimental	186
Anexo II: Cuestionario.....	210

Resumen

El turismo se ha caracterizado por ser un sector en continuo crecimiento (OMT, 2020) dando lugar a beneficios económicos y sociales para los destinos turísticos (Blancas, González, Guerrero y Lozano, 2010) pero, a la vez, ocasionando múltiples efectos negativos en su medio ambiente (Juvan y Dolnicar, 2017). Esta realidad, junto a la evolución de la sociedad y las políticas de los países, orientadas a la necesidad urgente de proteger el medio ambiente (Becken, Whittlesea, Loehr y Scott, 2020), ha llevado a los destinos a buscar soluciones que permitan conciliar el desarrollo de la actividad turística con la conservación del medio ambiente para proteger y garantizar su propia actividad a largo plazo (Blancas, Lozano y González, 2015).

En este sentido, la interpretación ambiental es una herramienta educativa elegida por instituciones públicas y profesionales del sector para entregar mensajes sobre sostenibilidad medioambiental, ya que contribuye a mejorar la actitud y el comportamiento proambiental (Ballantyne, Hughes, Lee, Packer y Sneddon, 2018; Coghlan y Kim, 2012) a la vez que resulta ser una experiencia satisfactoria y divertida (Kuo, Chang, Cheng y Lin, 2016; Powell y Ham, 2008). El efecto de la interpretación ambiental puede mejorar con el uso de la gamificación ya que hay estudios que sugieren que la gamificación puede ser eficaz para fomentar el comportamiento proambiental (Ouariachi, Li, y Elving, 2020) y que puede mejorar directamente la experiencia del turista (Xu, Buhalis, y Weber, 2017). Además, la literatura ha demostrado que las características de los turistas tienen una importante influencia en los resultados de la interpretación ambiental (Powell, Kellert y Ham, 2009). Considerando estas contribuciones, y dado el carácter internacional del mercado turístico, es relevante estudiar los efectos de la distancia psicológica de los turistas hacia el destino.

El principal objetivo de esta tesis, a partir del cual se establecen una serie de objetivos específicos, es examinar la eficacia de la interpretación ambiental gamificada mediante las tecnologías de la información y la comunicación (TICs), como estrategia para lograr la sostenibilidad medioambiental de los destinos turísticos y contribuir a su competitividad. Para ello, se desarrolla y valida una escala que recoge la experiencia de participación en una gamificación (denominada experiencia *gameful*) de forma aplicada a una interpretación ambiental. Tras la validación de la escala de experiencia *gameful*, como consecuencia de la participación en una interpretación ambiental gamificada, se comprueban sus efectos en variables clave del comportamiento del consumidor (valor percibido del destino, capital de marca del destino y comportamiento proambiental del turista), considerando una de las características de los turistas como es la distancia psicológica hacia el destino.

El logro de los objetivos propuestos, los resultados y las contribuciones alcanzadas en esta investigación se pueden encontrar en cuatro artículos que recogen las distintas fases de una misma investigación. La presente tesis doctoral sigue la modalidad de agrupación de publicaciones que recoge el artículo 18.4 de las Normas Regulatoras de las Enseñanzas Oficiales de Doctorado y del Título de Doctor por la Universidad de

Granada, según el cual “una tesis doctoral puede también consistir en el reagrupamiento en una memoria de trabajos de investigación publicados por el doctorando en medios científicos relevantes en su ámbito de conocimiento” siendo “el Comité de Dirección de la Escuela de Doctorado correspondiente el que establecerá el número mínimo de artículos necesarios para presentar una tesis en esta modalidad”. El Programa de Doctorado de Ciencias Económicas y Empresariales señala que se han de presentar un mínimo de 3 artículos publicados o aceptados para su publicación.

Tabla 1. Artículos que integran la tesis doctoral

Artículo 1	“Influence of gamification on perceived self-efficacy: gender and age moderator effect” publicado en <i>International Journal of Sports Marketing and Sponsorship</i> .
Artículo 2	“Gamified environmental interpretation as a strategy for improving destination perceived value” en proceso de revision en <i>Tourism & Management Studies</i> .
Artículo 3	“The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance” publicado en <i>Journal of Destination Marketing & Management</i> .
Artículo 4	“Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance” publicado en <i>Tourism Management</i> .

Los artículos científicos pueden incluirse “bien integrados como capítulos de la tesis o bien como un Anexo” y “la tesis debe contar, al menos, con los siguientes contenidos: título, resumen, introducción, objetivos, metodología, resultados, conclusiones y bibliografía” (artículo 18.3 y 18.4 de las Normas Regulatoras de las Enseñanzas Oficiales de Doctorado y del Título de Doctor por la Universidad de Granada) por lo que la presente tesis doctoral sigue la siguiente estructura:

Tabla 2. Estructura de la tesis

Resumen / Summary	
Capítulo I	Introducción
Capítulo II	Objetivos
Capítulo III	Metodología
Capítulo IV	Resultados

Capítulo V	Artículo 1: Influence of gamification on perceived self-efficacy: gender and age moderator effect
Capítulo VI	Artículo 2: Gamified environmental interpretation as a strategy for improving destination perceived value
Capítulo VII	Artículo 3: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance
Capítulo VIII	Artículo 4: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance
Capítulo IX	Conclusiones
Capítulo X	Bibliographic
Anexo I	Estímulo experimental
Anexo II	Cuestionario

Summary

Tourism has been characterized in the literature as a sector in continuous growth (UNWTO, 2020), giving rise to economic and social benefits for tourist destinations (Blancas et al., 2010) but, at the same time, causing multiple detrimental effects for their environment (Juvan & Dolnicar, 2017). This reality, together with society's evolving environmental awareness and the policies of different countries that are increasingly oriented toward the urgent need to protect the environment (Becken et al., 2020), has led destinations to seek solutions that reconcile tourism activity and environmental conservation—an approach that, in the long term, serves to protect and guarantee that tourism activity (Blancas et al., 2015).

Against this backdrop, environmental interpretation is one educational tool frequently employed by public institutions and professionals in the sector to deliver messages about environmental sustainability, as it contributes to improving pro-environmental attitudes and behaviours (Ballantyne et al., 2018; Coghlan & Kim, 2012) while also being a satisfying and fun experience for participants (Kuo et al., 2016; Powell & Ham, 2008). The effect of environmental interpretation can be improved by incorporating gamification, according to studies suggesting that gamification can be effective in promoting pro-environmental behaviour (Ouariachi et al., 2020) and that it can directly enhance the tourist experience (Xu et al., 2017). In addition, it has been found that certain characteristics of the tourist-participants themselves have an important influence on the outcomes of environmental interpretation experiences (Powell et al., 2009). On that premise, and given the international nature of the tourism market, it is relevant to study the effects of tourists' psychological distance (relative to the destination) on such experiences.

The primary aim of this thesis is therefore to examine the effectiveness of gamified environmental interpretation delivered via information and communication technologies (ICTs), as a strategy for achieving the environmental sustainability of tourist destinations and contributing to their competitiveness. A scale is developed and validated that includes the experience of participation in a gamification (a *gameful* experience) applied to environmental interpretation. Once the *gameful* experience scale is validated, as a consequence of participation in a gamified environmental interpretation, the effects on key variables of consumer behaviour (destination perceived value, destination brand equity, and tourist pro-environmental behaviour) are verified, taking into account one of the characteristics of tourists: psychological distance of the destination.

Due to the structure of the thesis-by-publication, the fulfilment of the proposed objectives, the results, and the contributions made in this research can be found in three articles published in high-impact scientific journals, along with a fourth article that is currently under review with another high-impact journal, as indicated below:

- **Article 1:** “Influence of gamification on perceived self-efficacy: Gender and age moderator effect” published in *International Journal of Sports Marketing and Sponsorship*.
- **Article 2:** “Gamified environmental interpretation as a strategy for improving destination perceived value”, currently under review with *Tourism & Management Studies*.
- **Article 3:** “The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance” published in *Journal of Destination Marketing & Management*.
- **Article 4:** “Gamified environmental interpretation as a strategy for improving tourist behaviour in support of sustainable tourism: The moderating role of psychological distance” published in *Tourism Management*.

Capítulo I: Introducción

1. Hacia un turismo más sostenible

La Organización Mundial del Turismo (OMT) define el turismo sostenible como “El turismo que tiene plenamente en cuenta las repercusiones actuales y futuras, económicas, sociales y medioambientales para satisfacer las necesidades de los visitantes, de la industria, del entorno y de las comunidades anfitrionas” (OMT, 2022).

1.1. La protección del medio ambiente en la actividad turística

Durante los últimos años, el sector turístico se ha caracterizado por experimentar un crecimiento imparable y continuo, como señalan los últimos informes de la OMT “Panorama OMT del turismo internacional” (OMT, 2018, 2019, 2020). Aunque el estallido de la pandemia por COVID-19 en marzo de 2020 supuso la paralización del sector, se está recuperando rápidamente ya que las llegadas de turistas internacionales en todo el mundo se duplicaron de enero a septiembre de 2022 (+133%) en comparación con el mismo periodo de 2021 (OMT, 2022).

El crecimiento y desarrollo de la actividad turística en estos años, ha generado importantes beneficios de tipo económico y social para los destinos turísticos, convirtiéndose en una importante fuente de riqueza (Blancas et al., 2010). En España, el turismo es actualmente un sector fundamental en la economía. Según la “Cuenta satélite del turismo en España”, en 2019 supuso el 12% del PIB y generó el 13% del empleo total. A pesar de la pandemia, sigue siendo un sector importante, creando el 13.3% del empleo total en el segundo trimestre de 2022 (EPA, 2022).

No obstante, el desarrollo del sector turístico también ha traído consigo múltiples efectos negativos en el medio ambiente de los destinos turísticos ya que provoca cambios y deterioro de la vegetación del lugar, puesta en peligro de la fauna local, escasez y pérdida de la calidad del agua, exceso de ruidos en el entorno, pérdida de la calidad del aire, etc. (Gössling y Peeters, 2015; Juvan y Dolnicar, 2017).

Los responsables de las políticas turísticas, así como las organizaciones turísticas y los investigadores de esta rama de actividad, vieron la necesidad de cambiar de rumbo y apostar por un sector turístico más medioambientalmente sostenible (Hall, 2019). En esta apuesta influyó inexorablemente la evolución de la sociedad y las políticas de los países, cada vez más orientadas a la necesidad de proteger el medio ambiente por los desafíos que depara el futuro, entre los que destaca el cambio climático (Becken et al., 2020). Así pues, la Agenda 2030 influye en las políticas turísticas de forma inevitable, aunque apenas haga referencia al turismo como actividad (Gössling, 2021; Hall, 2019). La Agenda 2030 de las Naciones Unidas (ONU) establece una serie de Objetivos de Desarrollo Sostenible (ODS), destacando la protección del planeta contra la degradación del medio ambiente.

La pandemia de la COVID-19 no ha hecho sino que aumentar la importancia de la Agenda 2030 ya que ha puesto en evidencia la importancia de luchar contra los problemas medioambientales, principalmente el cambio climático, por los peligros que pueden suponer para la salud del planeta y sus habitantes (Sunyer, Dadvand, Foraster, Gilliland y Nawrot, 2021). La pandemia por COVID-19 supuso la paralización de toda actividad humana mejorando los indicadores medioambientales (Moreno, Robina, Sánchez-Oro y Castro, 2021) y ha puesto de manifiesto que la actividad turística ha de centrarse en lograr “una transformación del sistema turístico global más alineada con los ODS” (Gössling, Scott y Hall, 2020, p. 15).

No obstante, la sostenibilidad medioambiental no es solo necesaria para no degradar el medio ambiente de los destinos turísticos, sino que es necesaria para la propia supervivencia del sector turístico (Juvan y Dolnicar, 2017). El turismo muestra una profunda dependencia de la calidad del entorno (White, McCrum, Blackstock y Scott, 2006). Un destino turístico con un medio ambiente degradado no es lo suficientemente atractivo como para hacer frente a la demanda actual, con lo que perdería competitividad y no tendría futuro en el sector (Fernández y Ramos, 2015; Scott, Hall y Gössling, 2019). La sostenibilidad medioambiental se convierte en un factor clave para la competitividad (Pulido-Fernández, Cardenas-García y Espinosa-Pulido, 2019).

Es importante, por tanto, que los destinos inviertan en conciliar el desarrollo de la actividad turística con la conservación de los recursos naturales para proteger y garantizar su propia actividad a largo plazo (Blancas et al., 2015). En este sentido, las soluciones regulatorias por el lado de la oferta se han mostrado insuficientes, por lo que existe un requerimiento para focalizar en el turista y que adopte una conducta más respetuosa con el medio ambiente (Dolnicar, 2020; Juvan y Dolnicar, 2017).

1.2. Un comportamiento del turista en apoyo de la sostenibilidad medioambiental

Los turistas generalmente tienen actitudes positivas hacia el medio ambiente y no desean comportarse de manera que impacte negativamente en el entorno, sin embargo hay evidencia de que desconocen el impacto que tiene en el medio ambiente las actividades que realizan durante sus vacaciones (Juvan y Dolnicar, 2014). Es necesario que los turistas sean conscientes que sus acciones individuales influyen en la sostenibilidad de los recursos (Ballantyne, Packer y Hughes, 2009).

La mayoría de los individuos relacionan la protección del medio ambiente con su vida diaria y no con su comportamiento durante las vacaciones (Dickinson, Robbins, Filimonau, Hares y Mika, 2013). Sin embargo, cualquier actividad que se realice en el contexto vacacional tendrá alguna consecuencia medioambiental negativa y el impacto de la actividad en el medio ambiente puede ser superior a los impactos de las actividades que las personas realizan en su vida cotidiana. Por ejemplo, la cantidad de agua que la gente usa en vacaciones es significativamente mayor que la cantidad de agua que usa en casa (Juvan y Dolnicar, 2017).

Instituciones, profesionales e investigadores del sector turístico buscan de forma continua soluciones y estrategias para mitigar los efectos negativos de la interacción de los turistas con el destino (Becken et al., 2020; Hall, 2019). Investigaciones previas apuntan al uso de una estrategia informativa orientada a mejorar el conocimiento y la actitud de los destinatarios y, a su vez, modificar sus comportamientos (Delmas, Fischlein y Asensio, 2013). La provisión de información es una de las estrategias más utilizadas (Abrahamse y Matthies, 2018). Además, las estrategias informativas pueden constituir un elemento importante en la implementación de otras estrategias como las regulaciones legales (Steg y Vlek, 2009). Sin embargo, la información por sí sola no es suficiente para cambiar el comportamiento. Debe ir acompañada de una sólida justificación para que el cambio de comportamiento se produzca de manera efectiva y se mantenga en el tiempo, y esto se puede lograr en un contexto educativo (Lehman y Geller, 2004). No obstante, a pesar de la importancia de la educación medioambiental, ha habido poca investigación sobre su impacto en la sostenibilidad medioambiental de los destinos, a excepción de algunos estudios que tratan sobre el uso de la interpretación ambiental (Gössling, 2018a).

La interpretación ambiental es una herramienta educativa que contribuye a mejorar la actitud y el comportamiento proambiental (Ballantyne et al., 2018; Coghlan y Kim, 2012) a la vez que resulta ser una experiencia satisfactoria y divertida (Kuo et al., 2016; Powell y Ham, 2008). Este segundo aspecto la hace ideal para el sector turístico ya que los turistas buscan la diversión y entretenimiento (Dolnicar, Lazarevski y Yanamandram, 2013), por lo que es elegida por instituciones públicas y profesionales del sector para entregar mensajes sobre sostenibilidad medioambiental.

2. La interpretación ambiental

Se define la interpretación ambiental como la traducción del lenguaje técnico de una ciencia natural o área relacionada en términos e ideas que puedan entender fácilmente las personas no científicas, entregadas de una manera que sea entretenida e interesante para los participantes (Ham, 1992). La interpretación ambiental puede incluir señales interpretativas al lado del sendero, exhibiciones interactivas, material audiovisual, folletos, visitas guiadas, centros de visitantes y otra información *online* y *offline* (Tan y Law, 2016).

La interpretación ambiental, como herramienta de educación medioambiental (Powell, Vezeau, Stern, Moore y Wright, 2018), es una estrategia eficaz para alcanzar la sostenibilidad medioambiental de los destinos turísticos (Ballantyne et al., 2018; Coghlan y Kim, 2012) ya que cumple una doble función: 1) fomenta un comportamiento proambiental entre los turistas (Ballantyne et al., 2018); y 2) genera experiencias más satisfactorias y divertidas para ellos (Powell y Ham, 2008). Mediante la interpretación ambiental, los turistas pueden aprender acerca del destino, sobre su idiosincrasia y sobre como colaborar en las labores de protección, pueden aumentar su nivel de conciencia medioambiental y pueden involucrarse más activamente en acciones proambientales (Powell y Ham, 2008) pero, a la vez, la interpretación ambiental consigue incrementar su satisfacción y diversión lo que

suele traducirse en una repetición de visita y en la recomendación a terceros (Ballantyne et al., 2018; Kuo et al., 2016).

Sin embargo, la interpretación ambiental no siempre produce los resultados esperados por lo que la literatura señala la necesidad de investigar en profundidad los factores que afectan a su efectividad (Ardoin, Wheaton, Bowers, Hunt y Durham, 2015; Lee, Jan y Chen, 2021). Este tipo de experiencias son complejas e involucran múltiples factores que determinan su éxito o fracaso (Ballantyne, Hughes, Lee, Packer y Sneddon, 2021; Powell, Vezeau, Stern, Moore y Wright, 2018; Powell et al., 2009).

La revisión bibliográfica señala el diseño de la interpretación ambiental como un factor determinante en sus resultados (Ardoin et al., 2015; Lee et al., 2021). A este respecto, se demanda un mayor uso de las TICs por las nuevas posibilidades que ofrecen para conseguir mejorar la experiencia turística (Gössling, 2021; Wolf, Stricker y Hagenloh, 2013), como es la posibilidad de interacción con los participantes (Coghlan y Carter, 2020). Los avances en las TICs permiten implementar diseños variados, desde simples folletos informativos multimedia hasta la gamificación. La incorporación de un diseño gamificado ofrece interesantes posibilidades porque hay estudios que sugieren que la gamificación puede ser eficaz para fomentar el comportamiento proambiental (Douglas y Brauer, 2021; Gössling, 2018b; Johnson, Horton, Mulcahy y Foth, 2017; Ouariachi et al., 2020) y que puede mejorar directamente la experiencia del turista (Xu et al., 2017). Esto indica que la gamificación puede ser una estrategia adecuada para mejorar los resultados de interpretación ambiental.

Sin embargo, a pesar de su potencial, la literatura previa no ha considerado el uso de la gamificación en el diseño de interpretación ambiental, ni cómo medir la experiencia del participante con dicho enfoque, ni cómo afecta al comportamiento del turista. Los estudios existentes solo nombran de forma breve y superficial la inclusión de diferentes juegos en la experiencia de interpretación (Ballantyne et al., 2021) o vinculan la interpretación ambiental con marcos teóricos relacionados con la gamificación (Coghlan y Carter, 2020).

Además, se ha demostrado que las características de los turistas, tales como la edad, la ocupación o el nivel educativo influyen en los resultados de la interpretación ambiental (Ballantyne, Packer y Falk, 2011; Kim, 2012). Dado el carácter internacional del mercado turístico, una variable relevante para los turistas sería la distancia psicológica hacia el destino turístico. Sin embargo, hasta la fecha no se han estudiado los efectos de la distancia psicológica en los resultados de la interpretación ambiental.

Con este punto de partida, resulta de interés profundizar en los efectos del diseño de la interpretación ambiental sobre sus resultados considerando el uso de la gamificación, así como avanzar en el estudio del efecto de características del turista en los resultados de la interpretación ambiental analizando la distancia psicológica hacia el destino.

3. Una interpretación ambiental gamificada

La gamificación se remonta a 2008, pero no fue hasta 2011 que se publicó la primera investigación académica sobre el tema. Los primeros estudios en gamificación adoptaron una perspectiva sistémica. Deterding, Dixon, Khaled y Nacke (2011, p.1) definieron gamificación como “el uso de elementos de diseño de juego en contextos de no juego”, convirtiéndose en la definición más extendida (Koivisto y Hamari, 2019). Sin embargo, este enfoque fue muy criticado por no incluir la experiencia del participante, considerada esencial en el mundo de los juegos. En respuesta, Huotari y Hamari (2017, p. 25) definieron la gamificación como: “un proceso de mejora de un servicio con *affordances* para generar experiencias *gameful* con el fin de apoyar el proceso completo de creación de valor del usuario”. La definición, anclada en la Lógica Dominante de Servicio (Vargo y Lusch, 2004), destaca la experiencia del participante, a la que llama experiencia *gameful*, e incluye el término *affordances* que se refiere a los elementos motivacionales incorporados en el juego que promueven los comportamientos deseados entre los participantes.

3.1. Diseño de una interpretación ambiental gamificada

Los avances en las TICs ofrecen nuevas posibilidades que pueden impulsar el desarrollo sostenible de los destinos (Fennell, 2021). La gamificación mediante las TICs puede considerarse una estrategia con capacidad para aumentar la sostenibilidad y, al mismo tiempo, mejorar la experiencia turística (Xu et al., 2017).

Hay estudios que sugieren que la gamificación puede ser eficaz para fomentar el cambio hacia un comportamiento más proambiental (Douglas y Brauer, 2021; Gössling, 2018b; Johnson et al., 2017; Ouariachi et al., 2020). Además, se ha encontrado que la participación en la gamificación genera: una mejor experiencia turística (Xu, Tian, Buhalis, Weber y Zhang, 2016; Xu et al., 2017); una respuesta afectiva y conductual más positiva hacia la marca o destino turístico por parte del participante (Hamari y Koivisto, 2014; Xu et al., 2017); y una mayor lealtad y compromiso con el destino (Abou-Shouk y Solliman, 2021; Xu et al., 2016, 2017).

No obstante, para que la gamificación de lugar a los resultados buscados, es fundamental que el participante tenga una experiencia *gameful* y, para ello, es necesario abordar el diseño de la gamificación de forma holística. Se trata de lograr un diseño que combine los *affordances* adecuados que primen la experiencia de los participantes. La mera inclusión de elementos aislados del juego no es suficiente para lograr un efecto positivo en el comportamiento del participante (Morschheuser, Werder, Hamari y Abe, 2017).

En el diseño holístico, se trata de seguir un proceso sistemático para identificar, evaluar y visualizar los diferentes aspectos, incluyendo el contexto, las características de los participantes, los objetivos, el diseño de la interfaz (a través de la cual el participante interactuará en la gamificación) y la evaluación de la experiencia del participante (Aparicio, Vela, Sánchez y Montes, 2012; Deterding, 2015; Morschheuser et al., 2017).

Con estas consideraciones previas, en la presente investigación se diseñó una interpretación ambiental gamificada de forma holística con lo que, a partir de las indicaciones identificadas en la revisión de la literatura, se siguió un procedimiento sistemático que comprendió cuatro etapas: 1) análisis del objetivo; 2) análisis del contexto y público objetivo; 3) diseño creativo de la interfaz con la que va a interactuar el participante; y 4) puesta en marcha y evaluación de la gamificación. La última fase es fundamental ya que el diseño de la gamificación se considerará que ha sido exitoso solo si ha generado una experiencia *gameful* entre los participantes.

3.2. La experiencia *gameful*

La experiencia *gameful* se considera esencial para identificar si la gamificación diseñada es efectiva desde la perspectiva del participante y es un paso previo fundamental antes de evaluar los resultados de la gamificación en las variables de comportamiento del consumidor (Huotari y Hamari, 2017).

Sin embargo, la mayoría de los autores pasan por alto la experiencia *gameful* y no la estudian como una consecuencia necesaria de la participación en una gamificación diseñada de forma holística (Huotari y Hamari, 2017; Koivisto y Hamari, 2019). Concretamente en el ámbito turístico, salvo el trabajo de Liu, Wang, Huang y Tang (2019), que se aplica al contexto de los festivales, y el de Lee (2019), que trata sobre el patrimonio monumental, los estudios previos se centran únicamente en los factores que facilitan la adopción y uso de determinadas características de la gamificación y su influencia en el comportamiento de los participantes.

Además, no existe un consenso académico sobre las dimensiones que forman una experiencia *gameful*, ni sobre cómo medirla (Deterding et al., 2011; Eppmann, Bekk y Klein, 2018; Huotari y Hamari, 2017). No obstante, las respectivas escalas desarrolladas por Eppmann et al. (2018) y Liu et al. (2019) coinciden en que es importante incluir una dimensión específica para reflejar la diversión de los participantes, mientras que Liu et al. (2019) destacan la importancia de que la gamificación estimule la motivación intrínseca de los participantes.

Por tanto, es de interés avanzar en el estudio de la experiencia *gameful*, como resultado de participar en una gamificación diseñada holísticamente, y de las dimensiones que conforman esa experiencia. En este trabajo de investigación, se llevó a cabo un estudio exploratorio y pretest para la validación de una escala de experiencia *gameful* que permitiera identificar las dimensiones de la experiencia de participar en una gamificación. Tras una revisión de la literatura se propuso una escala de experiencia *gameful* integrada por las dimensiones de motivaciones intrínsecas (autonomía, competencia y relación) y diversión, que fue validada a nivel empírico. Posteriormente, esta escala permitió evaluar la participación en una interpretación ambiental gamificada, corroborando que la experiencia *gameful* de una interpretación ambiental gamificada de un destino queda integrada por las dimensiones de autonomía, competencia, relación y diversión.

Una vez que se comprobó que el participante había experimentado una experiencia *gameful* se procedió a medir los resultados de la gamificación en variables del comportamiento del consumidor como el valor percibido, el capital de marca y el comportamiento proambiental (Huotari y Hamari, 2017).

4. Efecto de una interpretación ambiental gamificada en el comportamiento del consumidor.

La revisión de la literatura muestra que los autores coinciden en la doble función de la interpretación ambiental: mejorar el comportamiento proambiental y mejorar la experiencia turística (Ardoin et al., 2015), que va a redundar en una mejor valoración del destino turístico y por tanto en variables claves del comportamiento del consumidor (Ballantyne et al., 2018; Coghlan, Ruth Fox, Prideaux y Lück, 2011).

4.1. Efecto de una interpretación ambiental gamificada en el valor percibido y capital de marca

En relación con la evaluación que el turista lleva a cabo de su experiencia resulta de interés variables como: 1) el valor percibido, ya que se considera el mejor indicador de las variables clave del comportamiento de los turistas (p.e. Kim y Thapa, 2018) y es un importante indicador del nivel de conservación de los recursos del destino (Ahn y Kwon, 2020; Polo-Peña, Frías-Jamilena y Rodríguez-Molina, 2013); y 2) el capital de marca, ya que recoge la experiencia del turista de una forma muy completa y proporciona la base para las evaluaciones sobre el destino (Liu y Fang, 2018).

La definición más ampliamente aceptada de valor percibido sostiene que es “la evaluación general del consumidor sobre la utilidad de un producto basada en las percepciones de lo que recibe y lo que entrega” (Zeithaml, 1988, p.14). Por su parte, el capital de marca puede conceptualizarse desde el punto de vista del mercado con el modelo *Customer Based Brand Equity* (CBBE) como “el efecto diferencial del conocimiento de la marca sobre la respuesta del consumidor al marketing de la marca”. La mayoría de los estudios que miden CBBE utilizan las dimensiones de conciencia de marca, calidad de la marca, imagen de marca, valor percibido y lealtad a la marca (p.e. Kladou y Kehagias, 2014; Pike, Bianchi, Kerr y Patti, 2010; Zavattaro, Daspit y Adams, 2015). Sin embargo, los avances más recientes en la literatura especializada sobre el capital de marca aplicado a los destinos han tomado una perspectiva más global: la del valor general de la marca (*Overall Brand Equity*, OBE) (Yoo & Donthu, 2001). Estos últimos trabajos definen la OBE como “la respuesta diferente de los consumidores entre una marca focal y un producto sin marca cuando ambos tienen el mismo nivel de estímulos de marketing y atributos del producto”. El presente estudio adopta esta perspectiva más holística de la medición del capital de marca, haciéndose eco de otros estudios recientes en el campo del turismo (Frías-Jamilena, Polo-Peña y Rodríguez-Molina, 2017).

A pesar de su importancia, hay pocas investigaciones que analicen los resultados de la interpretación ambiental en la experiencia turística (Ardoin et al., 2015). Por tanto, es

de interés avanzar en la comprensión de sus efectos positivos en las variables de valor percibido y capital de marca. Con estas consideraciones previas, en este trabajo de investigación, se procedió a analizar si una interpretación ambiental gamificada influye de forma positiva en el valor percibido del destino turístico, así como a analizar si la participación en una interpretación ambiental gamificada (frente a una no gamificada) es capaz de generar un mayor capital de marca del destino.

4.2.Efecto de la interpretación ambiental gamificada en el comportamiento proambiental de los turistas

Se ha demostrado que la interpretación ambiental es una herramienta muy eficaz para obtener tres tipos de respuesta por parte de los turistas: 1) respuesta cognitiva: mejora el conocimiento medioambiental; 2) respuesta afectiva: mejora la actitud proambiental; y 3) respuesta comportamental: adopción de un comportamiento proambiental (Ardoin et al., 2015; Ballantyne et al., 2011; Cheung y Fok, 2014; Coghlan et al., 2011; Powell y Ham, 2008). Además, la gamificación puede ser eficaz para fomentar el comportamiento proambiental (Douglas y Brauer, 2021; Gössling, 2018b; Johnson et al., 2017; Ouariachi et al., 2020).

No obstante, la literatura ha planteado ciertas dudas sobre los resultados de la interpretación ambiental en el comportamiento proambiental (Lee et al., 2021) y la utilidad de la gamificación para estimular la adopción de conductas proambientales ha sido puesta en entredicho (p.e., Aguiar-Castillo; Rufo-Torres, Saa-Pérez y Pérez-Jiménez, 2018). Lo cierto es que en el comportamiento proambiental influyen múltiples factores (Gössling, 2018a; Wicker y Becken, 2013) por lo que es de interés profundizar en los efectos que el diseño de la interpretación ambiental genera en el comportamiento proambiental de los turistas. De forma que en este trabajo de investigación se propuso analizar el efecto de la participación en una interpretación ambiental gamificada (frente a una no gamificada) para comprobar si es capaz de generar la adopción de un mayor comportamiento proambiental entre los turistas.

5. El efecto moderador de la distancia psicológica

La distancia psicológica se define como la “experiencia subjetiva de que algo está cerca o lejos respecto al yo, aquí y ahora” (Trope y Liberman, 2010). La principal base teórica del concepto de distancia psicológica es la teoría del nivel de conceptualización que sostiene que los individuos construyen o conceptualizan la realidad mentalmente según la distancia psicológica percibida (Liberman y Trope, 2014).

Los académicos coinciden en que la distancia psicológica juega un papel importante en los mecanismos de evaluación y toma de decisiones de los individuos y que puede tener un gran impacto en su comportamiento (Lee et al., 2021; Trope, Liberman y Wakslak, 2007). En el contexto del turismo, los académicos han identificado que la distancia psicológica influye en variables relacionadas con el capital de marca del destino, como la lealtad (Shin, Chung, Kang y Koo, 2016, pp. 355–368), y en variables asociadas al comportamiento proambiental, como la intención de adoptar un

comportamiento proambiental, la actitud proambiental, la percepción de amenaza medioambiental o el compromiso con el medio ambiente (Chang, Zhang y Xie, 2015; Jones, Hine y Marks, 2017). Tal que, en idénticas circunstancias, un estímulo que se percibe como psicológicamente cercano conduce a mejores resultados en estas variables que uno percibido como psicológicamente lejano.

A pesar del consenso que existe entre los investigadores y que en el contexto turístico se debe considerar el carácter internacional del mercado turístico (que implica dirigirse a turistas que proceden de diferentes países), no se ha analizado hasta la fecha la influencia de la distancia psicológica hacia el destino en los resultados de la interpretación ambiental. Por ello, en este trabajo de investigación se analiza el efecto de la distancia psicológica hacia el destino en el capital de marca del destino y en el comportamiento proambiental de los turistas tras participar en una interpretación ambiental; y se da un paso más allá al analizar el efecto moderador que la distancia psicológica hacia el destino ejerce en los resultados que se alcanzan al participar en una interpretación ambiental gamificada (versus no gamificada), en las variables de capital de marca y comportamiento proambiental. El planteamiento de este efecto moderador se lleva a cabo a partir de diversas teorías psicológicas y supone un avance para la literatura.

En relación con la propuesta sobre el efecto moderador de la distancia psicológica, se ha demostrado que si se produce un ajuste entre la información percibida de un estímulo y la mentalidad del individuo que la percibe, se incrementan los efectos positivos sobre diferentes variables de comportamiento del consumidor (Chang et al., 2015; Chou y Lien, 2012; Lee, Keller y Sternthal, 2010; Mogilner, Aaker y Pennington, 2008) y la adopción de conductas proambientales (Chou y Lien, 2012; Grazzini, Rodrigo, Aiello y Vigilia, 2018; Jin y He, 2013; Lee y Oh, 2014). Una forma de lograr este ajuste es a través del “ajuste regulatorio conceptual” (Lee et al., 2010) que vincula la teoría del foco regulatorio (Higgins, 1997) y la teoría del nivel de conceptualización (Liberman y Trope, 2014).

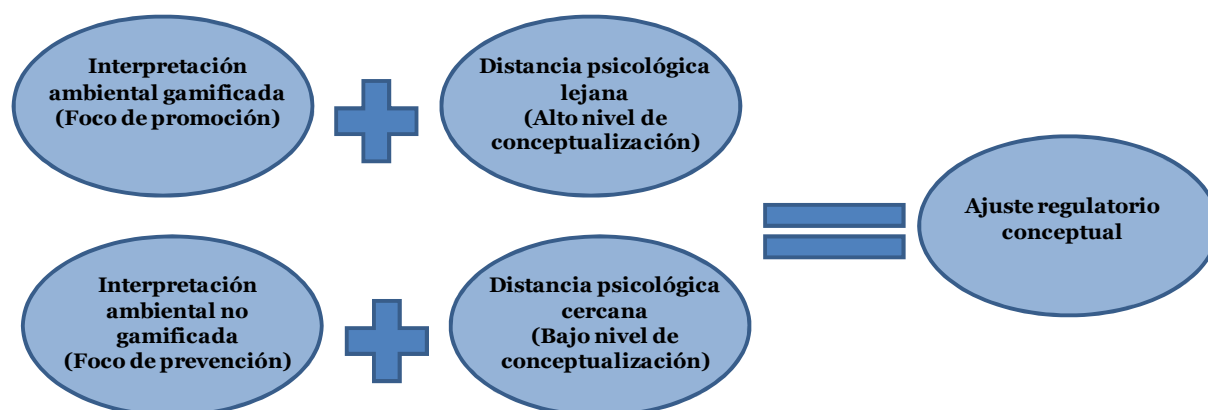
Según la teoría del foco regulatorio (Higgins, 1997), las personas perseguirán sus metas guiados por dos focos regulatorios distintos, promoción versus prevención, mientras que los individuos con foco de promoción se preocupan por avanzar, crecer y conseguir logros, los individuos con un foco de prevención se preocupan por su protección, su seguridad y sus responsabilidades (Higgins et al., 2001). Por su parte, según la teoría del nivel de conceptualización cuando un estímulo es percibido como psicológicamente cercano, se activa un bajo nivel de conceptualización y, por el contrario, cuando un estímulo es percibido como psicológicamente lejano, al requerir un mayor esfuerzo se activará un alto nivel de conceptualización (Trope y Liberman, 2010). Mientras que en el bajo nivel el estímulo se conceptualiza de forma específica, detallada y subordinada, en el alto nivel se hace de forma abstracta, general y superordinada.

Hay muchos estudios que exploran la conexión entre la teoría del nivel de conceptualización y la teoría del foco regulatorio (Chou y Lien, 2012; Lee y Higgins, 2009; Lee y Oh, 2014; Lerner, Streicher, Sachs, Raue y Frey, 2015). Se puede lograr

un ajuste regulatorio conceptual (Lee et al., 2010) cuando un foco de promoción se corresponde con una conceptualización de alto nivel (distancia psicológica lejana), o cuando un foco de prevención se encuentra con una conceptualización de bajo nivel (distancia psicológica cercana). Estos trabajos vinculan el foco regulatorio al nivel conceptual, teniendo en consideración cada una de las propiedades que los caracterizan.

A partir de aquí, en este trabajo de investigación, se apuesta porque una interpretación ambiental gamificada puede asociarse con el foco de "promoción" y, por el contrario, una interpretación ambiental no gamificada se puede asociar con el foco de "prevención". Una interpretación ambiental gamificada se puede relacionar con el foco de promoción debido a la premisa fundamental de que las gamificaciones tienen como base esencial un sistema de recompensas para satisfacer las necesidades de logro (Lee y Higgins, 2009) y una interpretación ambiental no gamificada con el foco de prevención ya que, en su inmensa mayoría, las interpretaciones ambientales hacen énfasis en los costes o consecuencias de no realizar una acción así como en la seguridad de sus participantes (Coghlan et al., 2011; Kim, 2012; Roberts, Mearns y Edwards, 2014; Tan y Law, 2016; Wiener, Needham y Wilkinson, 2009). Por lo tanto, puede ser que se logre un ajuste regulatorio conceptual entre aquellos individuos expuestos a una interpretación ambiental gamificada que perciban el destino como psicológicamente lejano y entre aquellos que están expuestos a una interpretación ambiental no gamificada que perciban el destino como psicológicamente cercano (Figura 1).

Figura 1. Ajuste regulatorio conceptual



6. Desarrollo de la tesis y relación entre las publicaciones: aportaciones.

Considerando que en este trabajo de investigación se trata de verificar si una interpretación ambiental gamificada, mediante las TICs, puede mejorar el valor percibido hacia el destino, el capital de marca del destino y el comportamiento proambiental de los turistas, y que se trata de comprobar la influencia y el rol moderador que la distancia psicológica percibida hacia el destino ejerce en los resultados, se han seguido los pasos siguientes:

- En primer lugar, se realizó un estudio exploratorio y pretest para la validación de una escala de experiencia *gameful* antes de proceder a diseñar y validar el diseño de la interpretación ambiental gamificada. Ello es necesario dado que para testar que el diseño de la gamificación orientada a los participantes es adecuado se ha de generar la llamada experiencia *gameful* entre los participantes. Tras una revisión de la literatura, se propuso una escala de experiencia *gameful* que quedaba integrada por las dimensiones de motivaciones intrínsecas (autonomía, competencia y relación) y diversión, escala que fue validada a nivel empírico. En segundo lugar, se llevó a cabo una revisión de la literatura que permitió identificar la importancia y gaps en relación con el diseño de la interpretación ambiental en sus resultados y las posibilidades que ofrecen las TICs, las características y *affordances* a considerar para proponer un diseño gamificado de las interpretaciones ambientales, las variables de los turistas que pueden influir en los resultados de la interpretación ambiental y los efectos que la interpretación ambiental genera en el comportamiento del turista. Se propuso de forma novedosa la gamificación de una interpretación ambiental aplicada a un destino turístico siguiendo un enfoque sistemático y aportando una orientación hacia los participantes, lo que implicó evaluar la experiencia *gameful* generada durante la participación en una interpretación ambiental gamificada (con la escala propuesta y validada a nivel empírico en el paso anterior).
- A continuación, se avanzó en el conocimiento de los efectos que genera la participación en una interpretación ambiental gamificada en variables relevantes para el comportamiento del consumidor como son:
 - Valor percibido: se comprobó a nivel empírico que la participación en una interpretación ambiental gamificada influye de forma positiva en el valor percibido del destino turístico.
 - Capital de marca: Se avanzó en el conocimiento de los efectos del uso de la gamificación al comprobar a nivel empírico que la participación en una interpretación ambiental gamificada mejora el capital de marca frente a una no gamificada. Para ello, se adoptó un diseño cuasi-experimental en el que se utilizó una interpretación ambiental gamificada versus una no gamificada.
 - Comportamiento proambiental: Se alcanzaron nuevas aportaciones en relación con los efectos del uso de la gamificación al aportar evidencia empírica de que la participación en una interpretación ambiental gamificada mejora el comportamiento proambiental de los participantes, frente a la participación en una no gamificada. Para ello, de nuevo, se adoptó un diseño cuasi-experimental en el que se utilizó una interpretación ambiental gamificada versus una no gamificada.
- Finalmente, se procedió a comprobar si la distancia psicológica hacia el destino influye en los resultados que se alcanzan al participar en una interpretación ambiental. De forma concreta, se comprobó a nivel empírico el efecto que la distancia psicológica hacia el destino ejerce en el capital de marca del destino y el

comportamiento proambiental de los turistas. Además, se analizó el efecto moderador de la distancia psicológica hacia el destino en los resultados que la interpretación ambiental gamificada (versus no gamificada) genera en el capital de marca del destino y el comportamiento proambiental de los turistas.

Los resultados y contribuciones alcanzadas en esta investigación se pueden encontrar en tres artículos publicados en revistas científicas de impacto, junto a un cuarto artículo que se encuentra en proceso de revisión en otra revista científica de impacto:

- Artículo 1: “Influence of gamification on perceived self-efficacy: gender and age moderator effect” publicado en *International Journal of Sports Marketing and Sponsorship*, 22 (3), 453-476. JCR (2020): Q3/ 2.938. JCR (2021): Q4/ 2.527. Revista indexada en el Social Science Citation Index (Web of Science Core Collection) (JCR-SSCI). En 2021 cuenta con un IF de 2.527, y está presente en la categoría "Hospitality, Leisure, Sport & Tourism" (Cuarto Cuartil – Q4). En 2020 cuenta con un IF de 2.938, y está presente en la categoría "Hospitality, Leisure, Sport & Tourism" (Tercer Cuartil – Q3).
- Artículo 2: “Gamified environmental interpretation as a strategy for improving destination perceived value” en *Tourism & Management Studies*. En revisión. Desde 2011, la revista está indexada en ScieloCitation Index of Web of Science. Desde 2017 está indexada en Emerging Sources Citation Index of Web of Science. Desde 2021 se encuentra listada en el JCR-SSCI.
- Artículo 3: “The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance” publicado en *Journal of Destination Marketing & Management*, 23, 100677. JCR (2021): Q1/ 7.158. Revista indexada en el Social Science Citation Index (Web of Science Core Collection) (JCR-SSCI). En 2021 cuenta con un IF de 7.158, y está presente en las categorías "Management" (Primer cuartil - Q1) y "Hospitality, Leisure, Sport & Tourism" (Segundo Cuartil). Desde 2017, de forma ininterrumpida se sitúa en el primer cuartil y desde el 2016 en el primer decil del JCR-SSCI en la categoría "Management".
- Artículo 4: “Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance” publicado en *Tourism Management*, 91, 104519. JCR (2021): Q1/ 12.879. Revista indexada en el Social Science Citation Index (Web of Science Core Collection) (JCR-SSCI). En 2021 cuenta con un IF de 12.879, y está presente en las categorías "Hospitality, Leisure, Sport & Tourism" (Primer decil - D1, primer cuartil - Q1), "Management" (Primer decil -D1, primer cuartil - Q1) y “Environmental Studies” y (Primer decil -D1, primer cuartil - Q1). Revista que eliminando las revistas de “sports”, puede considerarse el ‘top 1’. Desde 2010, de forma ininterrumpida se sitúa en el primer cuartil y desde el 2016 en el primer decil del JCR-SSCI.

Las aportaciones que recoge cada uno de los artículos científicos, se muestran en la Tabla 3.

Tabla 3. Aportaciones de la investigación recogidas en cada uno de los artículos científicos

Trabajo de investigación	Artículos
Estudio exploratorio y pretest para la validación de una escala de experiencia <i>gameful</i> .	Artículo 1
Diseño sistemático de una interpretación ambiental gamificada de un destino turístico y evaluación de la experiencia <i>gameful</i> .	Artículo 2
Efecto de la participación en una interpretación ambiental gamificada en el valor percibido del destino.	Artículo 2
Efecto de la participación en una interpretación ambiental gamificada en el capital de marca del destino turístico frente a la participación en una interpretación ambiental no gamificada.	Artículo 3
Efecto de la participación en una interpretación ambiental gamificada en el comportamiento proambiental de los turistas frente a la participación en una interpretación ambiental no gamificada.	Artículo 4
Análisis de la influencia que la distancia psicológica hacia el destino ejerce en el capital de marca tras participar en una interpretación ambiental y el rol moderador de la distancia psicológica hacia el destino en el efecto de la participación en una interpretación ambiental gamificada (versus una no gamificada) sobre el capital de marca del destino.	Artículo 3
Análisis de la influencia que la distancia psicológica hacia el destino ejerce en el comportamiento proambiental tras participar en una interpretación ambiental y el rol moderador de la distancia psicológica hacia el destino en el efecto de la participación en una interpretación ambiental gamificada (versus una no gamificada) sobre el comportamiento proambiental de los turistas.	Artículo 4

Capítulo II: Objetivos

El principal objetivo de esta tesis es examinar la eficacia de la interpretación ambiental gamificada mediante las TICs, como estrategia para lograr la sostenibilidad medioambiental de los destinos turísticos y mejorar la experiencia turística, contribuyendo a la competitividad del destino. Para ello se comprueban los efectos de una interpretación ambiental gamificada en variables clave del comportamiento del consumidor (valor percibido del destino, capital de marca del destino y comportamiento proambiental del turista), considerando una de las características de los turistas como es la distancia psicológica hacia el destino. Para alcanzar este objetivo principal, se establecen los siguientes objetivos específicos:

Objetivo 1: Proponer y validar, basándose en la revisión de la literatura, una escala de experiencia *gameful* que permita comprobar si el diseño de la gamificación orientada a los participantes es adecuado.

Objetivo 2: Proponer y validar, basándose en la revisión de la literatura, una interpretación ambiental gamificada diseñada siguiendo un enfoque holístico y orientado al participante.

Objetivo 3: Demostrar si la participación en una interpretación ambiental gamificada influye de forma positiva en el valor percibido del destino turístico.

Objetivo 4: Establecer si la participación del turista en una interpretación ambiental gamificada mejora el capital de marca del destino turístico (frente a los que participan en una interpretación ambiental no gamificada).

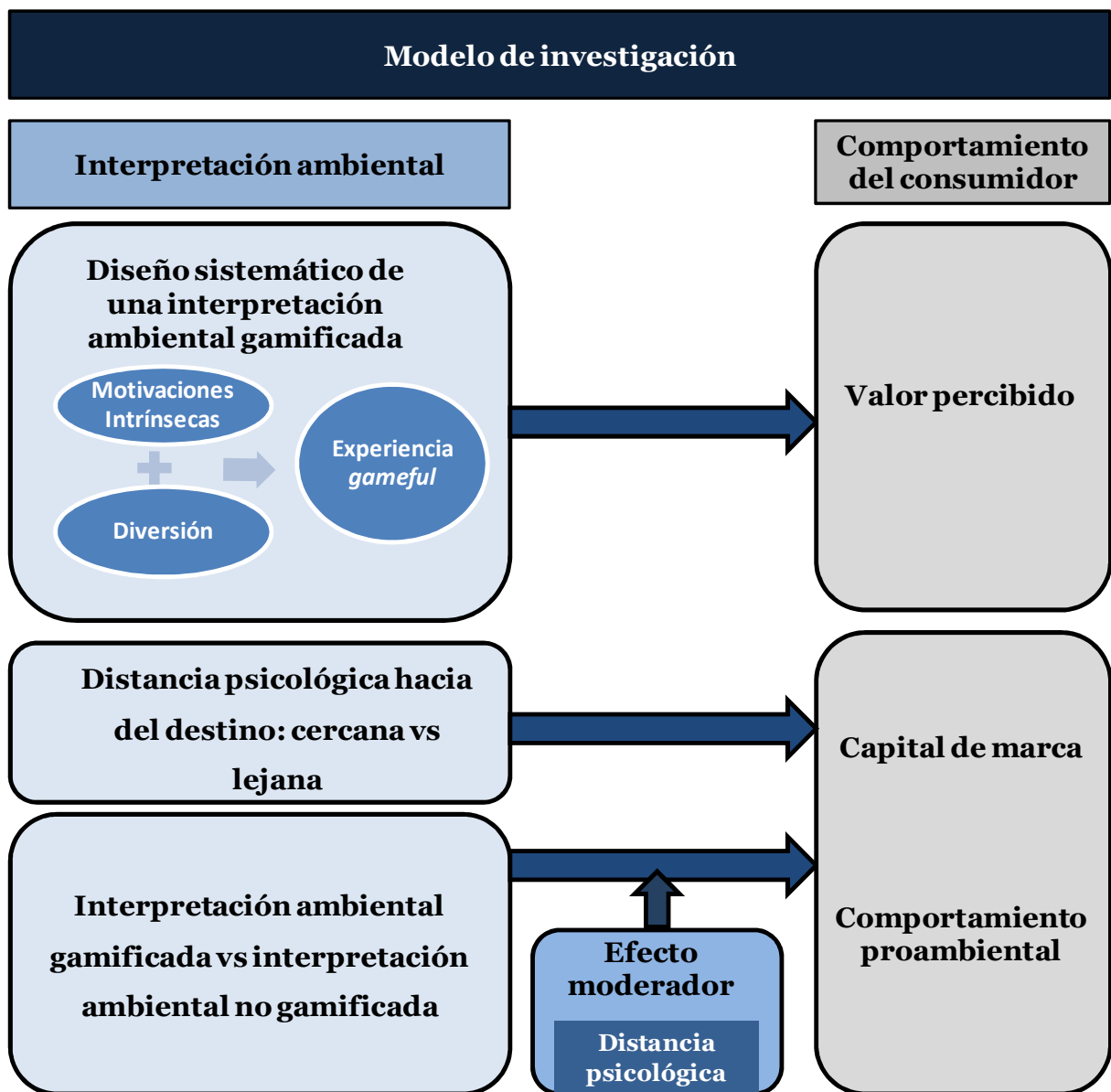
Objetivo 5: Probar si la participación del turista en una interpretación ambiental gamificada mejora el comportamiento proambiental de los participantes (frente a los que participan en una interpretación ambiental no gamificada).

Objetivo 6: Comprobar si una característica del consumidor, como es la distancia psicológica hacia el destino influye en el capital de marca del destino y en el comportamiento proambiental de los turistas.

Objetivo 7: Verificar si la distancia psicológica hacia el destino modera el efecto de la interpretación ambiental gamificada sobre el capital de marca del destino y sobre el comportamiento proambiental de los turistas.

Para cumplir los objetivos se plantea el siguiente modelo de investigación (Figura 2)

Figura 2. Modelo de investigación



Debido a la estructura de la tesis como reagrupamiento de artículos, se puede verificar el logro de los objetivos marcados a través de distintos artículos (Tabla 4).

Tabla 4. Relación de objetivos propuestos por artículos

Objetivos	Artículos
Objetivo 1	Artículo 1
Objetivo 2	Artículo 2
Objetivo 3	Artículo 2
Objetivo 4	Artículo 3

Capítulo II: Objetivos

Objetivo 5	Artículo 4
Objetivo 6	Artículo 3-capital de marca del destino
	Artículo 4-comportamiento proambiental de los turistas
Objetivo 7	Artículo 3-capital de marca del destino
	Artículo 4-comportamiento proambiental de los turistas

Capítulo III: Metodología

Para realizar el trabajo de investigación empírico, en primer lugar se propuso una escala de experiencia *gameful*, integrada por las dimensiones de motivaciones intrínsecas (autonomía, competencia y relación) y diversión, que fue validada a nivel empírico y que permitió continuar con el diseño y validación de la interpretación ambiental gamificada, pues la gamificación ha de generar necesariamente una experiencia *gameful* entre los participantes para considerar que el diseño de la gamificación orientada a los participantes es adecuado.

En segundo lugar, se procedió al diseño de una interpretación ambiental, implementada a través de las TICs, que versa sobre España como destino turístico y que hace referencia a la fase de pre-estancia, con dos versiones, una gamificada (contenido multimedia diseñado para generar una experiencia *gameful*) y otra sin gamificar (solamente contenido multimedia). Las dos versiones contenían información homogénea, el mismo número de palabras y las mismas imágenes, solo diferían en las características de diseño necesarias para que una de ellas fuera una gamificación orientada a generar una experiencia *gameful* (Anexo 1).

Una vez diseñadas las dos versiones de la interpretación ambiental, a través de un panel de usuarios de Internet se envió un correo electrónico a los participantes con un enlace a un sitio web a partir del que pasaban a contestar un primer cuestionario, a continuación, eran asignados de forma aleatoria para participar en la interpretación ambiental de la versión gamificada o no gamificada. Una vez participaban e interactuaban con la interpretación ambiental pasaban a contestar un cuestionario que recogía las escalas de medición de las variables dependientes y variables sociodemográficas del perfil de la muestra. Los participantes eran todos turistas potenciales de origen anglosajón, que tenían que cumplir el requisito de no haber visitado nunca antes España. La muestra estuvo compuesta por 314 sujetos válidos, de los que 158 participaron en la interpretación ambiental gamificada y 156 en la no gamificada.

Para el análisis de los datos obtenidos se utilizaron las siguientes metodologías:

- Para validar la escala de experiencia *gameful* propuesta y la de experiencia *gameful* resultante de la participación en la interpretación ambiental gamificada así como para analizar el efecto de la experiencia *gameful* en el valor percibido del destino se consideró que la metodología más adecuada era la de modelos de ecuaciones estructurales (SEM), con el software AMOS 21, dado que el modelo de investigación incluía variables latentes que no eran directamente observables (Hair, Black, Babin y Anderson, 2009, pp. 541–591).
- Para probar los efectos de la interpretación ambiental gamificada frente a la no gamificada en el capital de marca y en el comportamiento proambiental, así como la influencia y el efecto moderador de la distancia psicológica en estas variables, se planteó un cuasi-experimento diseñado con un grupo de control y

una medida post-test (Zikmund, 1998). Así, se dispone de una variable de tratamiento, el tipo de interpretación ambiental (gamificada versus no gamificada), y una variable dependiente, el capital de marca o el comportamiento proambiental, incluyendo una variable moderadora, la distancia psicológica hacia el destino. (Zikmund, 1998). La metodología más adecuada para esta investigación es un análisis de varianza (ANOVA), utilizando el software SPSS V.25, según el cual se ha planteado como variable dependiente el capital de marca o el comportamiento proambiental y como variables independientes el tipo de interpretación ambiental y la distancia psicológica.

Capítulo IV: Resultados

En primer lugar, el desarrollo del pretest permitió validar una escala propuesta de experiencia *gameful*, confirmando que la diversión, así como las motivaciones intrínsecas (autonomía, competencia y relación) son dimensiones que integran la experiencia *gameful*. En segundo lugar, se validó el diseño holístico y orientado al participante de la interpretación ambiental gamificada al generar una experiencia intrínsecamente motivadora y divertida (la experiencia *gameful*) entre los participantes. En tercer lugar, se analizó y se obtuvo apoyo empírico sobre los efectos de la interpretación ambiental gamificada en las variables de comportamiento del consumidor:

- Una interpretación ambiental gamificada ejerce un efecto positivo y significativo en el valor percibido del destino ($p \leq 0,01$).
- Una interpretación ambiental gamificada tiene un efecto positivo significativamente mayor que una interpretación ambiental no gamificada en el capital de marca (Media no gamificada = 4,27 frente a Media gamificada = 4,65, $F = 6,22$, $p \leq 0,01$)
- Una interpretación ambiental gamificada tiene un efecto positivo significativamente mayor que una interpretación ambiental no gamificada en el comportamiento proambiental (Media no gamificada = 4,18 vs. Media gamificada = 4,62, $F = 6,83$, $p \leq 0,01$).

En cuarto, respecto a la distancia psicológica, se obtuvo evidencia empírica de que el capital de marca (Media distancia psicológica cercana = 5,02; Media distancia psicológica lejana = 3,97, $F = 54,75$, $p \leq 0,01$) y el comportamiento proambiental (Media distancia psicológica cercana 4,99; Media distancia psicológica lejana 3,88, $F = 47,86$, $p \leq 0,01$) arrojan mejores resultados para los sujetos con una distancia psicológica cercana al destino. En quinto y último lugar, se verificó el efecto moderador de la distancia psicológica en los efectos de la interpretación ambiental gamificada versus no gamificada. Los resultados pusieron de manifiesto que en sujetos con una distancia psicológica lejana al destino una interpretación ambiental gamificada genera un capital de marca y un comportamiento proambiental significativamente mayor que una no gamificada ($p \leq 0,01$) mientras que en sujetos con distancia psicológica cercana al destino, no hay diferencias significativas entre una interpretación ambiental gamificada y una no gamificada ni en el capital de marca ($p = 0,99$) ni en el comportamiento proambiental (valor $p = 0,97$).

Los resultados obtenidos se muestran de forma detallada en los cuatro artículos científicos que forman parte de la investigación llevada a cabo en esta tesis doctoral y se resumen en la Tabla 5.

Tabla 5. Resultados del trabajo de investigación

Resultados	Artículos
Propuesta y validación de la escala de experiencia <i>gameful</i> (integrada por las dimensiones de autonomía, competencia, relación y diversión).	Artículo 1
Propuesta y validación de la interpretación ambiental gamificada diseñada siguiendo un enfoque holístico y orientado al participante que genera una experiencia <i>gameful</i> .	Artículo 2
Efecto positivo y significativo de la participación en una interpretación ambiental gamificada en el valor percibido del destino.	Artículo 2
Efecto positivo y significativamente mayor en el capital de marca del destino cuando se participa en una interpretación ambiental gamificada (frente a una no gamificada).	Artículo 3
Efecto positivo y significativamente mayor en el comportamiento proambiental de los turistas cuando se participa en una interpretación ambiental gamificada (frente a una no gamificada).	Artículo 4
Efecto positivo y significativamente mayor en el capital de marca del destino cuando los participantes tienen una distancia psicológica cercana al destino (frente a los que tienen una distancia psicológica lejana al destino).	Artículo 3
Efecto positivo y significativamente mayor en el comportamiento proambiental cuando los participantes tienen una distancia psicológica cercana al destino (frente a los que tienen una distancia psicológica lejana al destino).	Artículo 4
<p>Efecto moderador de la distancia psicológica al destino, de forma que:</p> <ul style="list-style-type: none"> - Para los participantes con una distancia psicológica lejana al destino, el efecto de la participación en una interpretación ambiental gamificada en el capital de marca del destino es significativamente mayor que para la participación en una no gamificada. - Para los participantes con una distancia psicológica cercana al destino, el efecto de la participación en una interpretación ambiental gamificada en el capital de marca del destino no es significativamente distinto al alcanzado en la participación de una no gamificada. 	Artículo 3

Capítulo IV: Resultados

Resultados	Artículos
<p>Efecto moderador de la distancia psicológica al destino, de forma que:</p> <ul style="list-style-type: none">- Para los participantes con una distancia psicológica lejana al destino, el efecto de la participación en una interpretación ambiental gamificada en el comportamiento proambiental es significativamente mayor que para la participación en una no gamificada.- Para los participantes con una distancia psicológica cercana al destino, el efecto de la participación en una interpretación ambiental gamificada en el comportamiento proambiental no es significativamente distinto al alcanzado en la participación de una no gamificada.	<p>Artículo 4</p>

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect.

Artículo 1

Autor/es	Ana Isabel Polo-Peña, Dolores María Frías-Jamilena y María Lina Fernández-Ruano
Título	Influence of gamification on perceived self-efficacy: gender and age moderator effect.
Revista	International Journal of Sports Marketing and Sponsorship
Fecha	11 de Agosto de 2020
Volumen, número	Vol. 22, No.3
Páginas	453-476
DOI	https://doi.org/10.1108/IJSMS-02-2020-0020
Índices de Impacto	Datos del Journal Citation Reports último año publicado (2021) <ul style="list-style-type: none">• Factor de impacto: 2.527• Cuartil: Q4• Categoría: HOSPITALITY, LEISURE, SPORT & TOURISM – SSCI• Posición 44 de 58 en el área de HOSPITALITY, LEISURE, SPORT & TOURISM – SSCI
Indexación en bases de datos	Revista indexada en: <ul style="list-style-type: none">• ABDC Inform• Australian Business Deans Council (ABDC) Chartered Association of Business Schools ReadCube Discover

1. Introduction

In advanced societies, it is common for lifestyles to become increasingly sedentary—a phenomenon that combines with a progressively ageing population (WHO, 2014). This scenario has become one of the most pressing challenges to be addressed by developed countries, due to the major social and economic consequences to which it can lead (Warner, 2019). There are many campaigns led by public bodies in an attempt to promote practices that encourage people to remain active as they get older. As part of these efforts, there is a call for practical tools to help the population acquire healthy lifestyle habits, including playing sports or exercising regularly (Penedo and Dahn, 2005; Warner, 2019).

Efforts to increase take-up of sports and exercise among the population requires the variables that are critical in changing user behavior to be identified, such as perceived self-efficacy, for instance. Perceived self-efficacy is concerned with the person's belief about how capable they are of performing given tasks (Bandura, 1982), and it therefore fundamentally affects the actions they take or intend to take (Bandura, 1986, 1989, 1998). In the sports and exercise context, perceived self-efficacy contributes to the promotion of greater physical activity and health improvements (Bandura, 1998; Dadaczynski *et al.*, 2017) and is considered one of the best predictors of physical exercise performance (Litman *et al.*, 2015).

One strategy that can help increase perceived self-efficacy is gamification (Dadaczynski *et al.*, 2017; Richter *et al.*, 2015). In the realm of sports, currently the potential offered by smart devices (wearable technology) is particularly striking (Ha *et al.*, 2017, 2015; Kim and Chiu, 2019; Song *et al.*, 2018; Tu *et al.*, 2019), such as smartbands (Castelnuovo *et al.*, 2014; IPSOS, 2017, 2020). Smartbands typically offer gamification features designed to generate motivating and enjoyment user experiences and thus facilitate change and/or the adoption of new habits (Hamari *et al.*, 2014).

Currently, the use of wearable devices is widespread and attracts both males and females and users of different ages (Kim and Chiu, 2019; Janssen *et al.*, 2017). Although the literature demonstrates that men present a higher degree of adoption of technology than women (Li and Kirkup, 2007) and that young people present a higher degree of adoption than older users (Kim and Chiu, 2019), the data specifically relating to the adoption of wearable technology for sports practice indicate that the gender division is practically non-existent and that the age gap is narrowing significantly (IPSOS, 2017, 2020). In view of these data, it is interesting to identify strategies based on the use of wearable devices (such as gamification) that help promote regular physical exercise and sport among the different groups in society.

In the sports context, empirical studies have been conducted to establish the effects of gamification (e.g. Hamari and Koivisto, 2014, 2015a, b). While these studies focus on the factors that facilitate the adoption and use of gamification and its influence on user behavior, they do not analyze the effects of using game-based features on one of

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

the key variables in taking up sports or exercise: perceived self-efficacy. The literature affirms that well-designed gamification should take the user perspective into account (Eppmann *et al.*, 2018). Therefore, given the effort required to keep up any exercise or sport routinely, the present study seeks to demonstrate that well-designed gamification features do indeed create a user experience that is intrinsically motivating (based on the dimensions of competence, autonomy and relatedness) and also enjoyment(Hamari *et al.*, 2014; Merhi, 2016).

The effectiveness of gamification as a mechanism to achieve perceptions of greater self-efficacy may be influenced by the characteristics of the users themselves, such as the socio-demographic variables of gender and age (Conaway and Cortés-Garay, 2014; Haro-González *et al.*, 2018; Hazari, 2018; Janssen *et al.*, 2017; Song *et al.*, 2018). In the sports context, it has been observed that women are less active than men and that older people are less active than younger people (European Commission, 2018; Spanish Ministry of Education, Culture and Sport, 2018).

The literature also finds that people use different models of motivation and present different degrees of determination to remain firm in their decisions and/or different learning capabilities vis-à-vis a given task, depending on their gender and age (e.g. Kautonen *et al.*, 2011; Lévesque and Minniti, 2006; Whittingham, 2017; Zhang *et al.*, 2009). It is therefore interesting to question whether an individual's experience of participating in gamification may be more or less effective (in terms of its impact on their perceived self-efficacy in regular exercise or sporting activity), depending on the gender and age of the participant.

In view of the above, the purpose of this study is to analyze whether gamification is an appropriate strategy for helping participants to perceive themselves as having greater self-efficacy in their chosen sport or exercise, taking into account the moderating effect of participant gender and age. More specifically, the specific objectives of this research are: 1) to examine whether participation in a gamification program using smartbands generates an internal experience for the individual that is intrinsically motivating (considering the dimensions of competence, autonomy and relationship) and fun; 2) to establish whether the experience of participating in gamification helps participants to perceive greater self-efficacy when practicing sport or exercise; and 3) to analyze the moderating effect of the variables 'gender' and 'age' on the relationship between the experience of participating in a gamification program and perceived self-efficacy.

2. Literature review and hypotheses

2.1. Perceived self-efficacy and participation in sports or exercise

The literature shows that there are numerous elements that may influence people to take up physical exercise or sport and maintain the habit of regular practice (Wang *et al.*, 2018). Among these elements are the socio-cultural environment surrounding the individual, the prevalent economic conditions, sports traditions among regions and

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

communities and the priorities established by local authorities, as well as the degree of economic development, consumption, and local authority support for sport-related leisure in the region in question (Wang et al., 2018). It is also useful to consider the preferences that different profiles of people may present when exposed to the offer of sports centers (Haro-González et al., 2018). For this reason, if the population is to be encouraged to practice sport and/or physical exercise as part of their healthy habits, it is essential that there are policies in place to ensure the availability of sports facilities and equipment for the general public, in addition to programs that promote sports.

The literature has also demonstrated that the provision of sports facilities, equipment, and programs—or the lack thereof—can influence the decisions people on whether to practice physical exercise and/or sport or not (eg: Wang et al., 2018). While such external conditioning factors will result in individuals having certain options for practicing regular physical exercise and/or sport, it is equally necessary to study the internal factors specific to each person—those that are under their control—in terms of how they, too, influence the degree to which individuals adopt a regular physical exercise practice and/or a sport. One such internal factor is self-efficacy.

Self-efficacy can be defined as the individual's perception or personal belief about their ability to perform certain tasks in pursuit of the objectives set or to deal with a given situation (Bandura, 1977, 1982). In the specific field of sport, self-efficacy in exercise has been defined as how confident the individual feels about his or her ability to handle specific exercises in specific circumstances (Sallis and Owen, 1998).

The perception of self-efficacy is experienced on the basis of several criteria or sources of information: 1) the level of performance achieved or experiences of complete mastery; 2) the observed performance or achievement of others, or vicarious experiences provided by social models; 3) verbal persuasion and social influences (so-called social persuasion); and 4) the individual's psychological state (Bandura, 1977, 1982, 1989).

Self-efficacy has therefore been found to be a fundamental variable that defines the behavior of individuals and has been shown to contribute significantly to both behavioral intention and current behavior (Ajzen, 2002). It has also been affirmed that, given that people's day-to-day lives can sometimes be full of difficulties and challenges to deal with, to achieve the desired goals and a good level of well-being, the individual needs to have an optimistic sense of self-efficacy (Bandura, 1989).

Therefore, to build the habit of routine exercise or sporting activity, it is important to consider perceived self-efficacy because this will be fundamentally affecting the actions the individual wants to take (Bandura, 1986, 1989, 1998). In the context of sport, a low perception of self-efficacy may deter the individual from their intention to keep up the routine. Hence, self-efficacy has been linked to the promotion of greater physical activity and improved health (Bandura, 1998; Dadaczynski *et al.*, 2017; Litman *et al.*, 2015; Sallis and Owen, 1998), and is now recognized as one of the

best predictors of performance in physical exercise and sport (Litman *et al.*, 2015). People with a high level of perceived self-efficacy work harder and recover more quickly from failures, persevering in working toward their goals (Schwarzer *et al.*, 1997). In turn, strong perseverance generally produces high-performance achievements (Bandura, 1982).

Given that perceived self-efficacy is a variable that can help individuals to produce the dedication and effort necessary to keep up routine exercise or sporting activity, it is of interest to identify strategies that may contribute to achieving greater perceived self-efficacy, and to consider gamification as a possible means of enhancing this self-perception.

2.2. Gamification and its effect on perceived self-efficacy

The most well-known and widely-applied definition of gamification is that of Deterding *et al.* (2011), who described it as “the use of game design elements in non-game contexts.” The elements of a game that commonly feature in gamification are patterns, objects, models, principles and methods. Gamification is often proposed as a solution to encourage certain desired behaviors, such as exercising, sustainable consumption or learning. The main difference between games and gamification is that the latter is commonly used to make progress toward objectives beyond the game (e.g. supporting healthier lifestyles, greener consumption or better financial decisions), while playing games is considered purely autotelic or intrinsically motivating (Hamari and Koivisto, 2014).

Another very common definition is that of Huotari and Hamari (2016), who formulate their view based on Service-Dominant Logic (Vargo and Lusch, 2004), as follows: “Gamification refers to a process of enhancing a service with *affordances* for *gameful* experiences in order to support users’ overall value creation.” According to Hamari *et al.* (2014), this definition focuses on the user’s experience when they participate in gamification, which is considered key to the design and use of gamification features.

The approach proposed by Huotari and Hamari (2016), which positions the concept of gamification within Service-Dominant Logic, on the basis that the gaming literature and the service-marketing literature are complementary. They start by considering the design elements of games as services, and by approaching games as if they were service systems comprising operant and operand resources. Thus, the games are co-produced by the game-creator (who offers the service), and the players are always co-creators of value. The skills of the players, their previous experience and their knowledge become resources contributing to the game and giving rise to a unique and subjective experience (Huotari and Hamari, 2016).

From this perspective, it is the experience of the participant that makes it possible. To distinguish when a program can genuinely be understood as an example of gamification (in which the participant must find the experience intrinsically motivating and fun) and when it is merely a collection of different elements of a game

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

(such as points, rankings or badges) in which no such experience associated with gamification is generated.

Seaborn and Fels (2015) conduct a comprehensive review of the research performed in this field, and find there is a need to focus on how the participant *experiences* a gamification activity, because the results of most applied research in this field have been based on systems of game elements, and not on the experiences of users while participating. Eppmann *et al.* (2018) reach the same conclusion, as do Tu *et al.* (2019). The former analyze gamification based on a review of the literature from the gaming area, highlighting the perspective of the participant, while the latter analyze the influence of certain game elements on user behavior. This suggests that, to progress in the study of the effects of gamification use, it is essential to adopt the perspective of the participants themselves and to identify the key variables that influence the experience in the context of exercise or sporting activities, where intrinsic motivation is essential (competence, autonomy and relatedness), as is a sense of enjoyment (feeling of happiness, enjoyment and momentary entertainment) (Merhi, 2016).

Increasing a person's intrinsic motivation will lead them closer to a deep commitment and major satisfaction (Deci *et al.*, 1999). Intrinsic motivation, in this context, refers to playing for the pure enjoyment of doing so (Ryan and Deci, 2000), for the hedonistic value of the game. Intrinsic motivation can be heightened through the use of game mechanics, which attract players to the enjoyment of the activities in which they participate.

According to the theory of self-determination, there are three groups of intrinsic reward groups: competence, autonomy and relationship (McGonigal, 2011; Ryan and Deci, 2000; Schell, 2008), as follows:

Competence. Normally, this includes the player's feeling of having the ability to master the system and achieve goals. Instant feedback, progression, leaderboards and levels all contribute to motivation born out of a growing sense of competence (Csikszentmihalyi, 2008). Similarly, the leisure motivation also includes elements of challenge and expertise (Beard and Ragheb, 1983). Through gamification, participants can build competence through practice and enjoy the feeling of achievement and of mastering the game system.

Autonomy. This is the personal will to act (McGonigal, 2011; Schell, 2008). Profiles, avatars or control of privacy are all elements that can be provided in the game, the idea being that gamification offers options through which the participant can achieve a sense of being able to choose freely.

Relatedness. Gamification involves interacting and connecting with other players (Schell, 2008). Groups, messages, blogs, chat functions, and connection with social networks are habitual representations of relatedness (McGonigal, 2011). The intrinsic reward of 'relatedness' in gamification experiences can lie in the fact that the

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

participant can interact with co-players and share their gaming experiences with other friends who are also connected via the gamification system.

The enjoyment element refers to a specific state of happiness or fun generated by a pleasant experience (Ahn *et al.*, 2007; Liu *et al.*, 2011; Merhi, 2016), beyond the specific result achieved out of that experience (Holbrook, 1994). This feeling should be considered a facet of participation in games (Ha *et al.*, 2007).

In the context of gamification, enjoyment is understood as spontaneity in users' interaction with the gamification system (Hamari and Koivisto, 2015a; Martocchio and Webster, 1992). In other words, enjoyment refers to users' exploratory and creative behavior when interacting with the system (Hamari and Koivisto, 2015a). The generation of enjoyment helps the participant persevere with the longer-term behaviors promoted by the gamification experience (Deci *et al.*, 1999; Deci and Ryan, 1985; Wu and Liu, 2007). In fact, enjoyment influences how consumers respond to the presentation of a product innovation (Aroean, 2012), and it also increases people's interest in exploring new things or products (Ghani and Deshpande, 1994; Hoffman and Novak, 1996).

Although gamification has shown increasingly common in contexts such as the adoption of healthy habits through exercise or sports (Hamari and Koivisto, 2014, 2015a, b), previous studies focus on the factors that facilitate the adoption and use of gamification features and their influence on the behavior of the participant, but they do not analyze the participant's experience of the gamification itself.

One exception in the literature, that of Tu *et al.* (2020), finds that the use of relatedness-oriented gamification is more beneficial in maintaining habitual sports practice than the use of enjoyment-oriented gamification. However, despite this notable contribution, it must be acknowledged that the experience of participating in gamified programs should provide the participant with an intrinsically motivating experience (which includes the need to relate to others, along with autonomy, competence, and enjoyment). It is this dearth of research examining the participant's experience that the present study seeks to address.

According to the extant literature, a well-designed gamification program is considered to generate more significant responses in terms of behavioral change among participants, compared to other options that can be considered merely a collection of game elements or that meet participants' needs only partially. The literature finds that a well-designed gamification experience must be intrinsically motivating (through the variables of competence, autonomy and relatedness) and generate a state of enjoyment (Hamari *et al.*, 2014; Merhi, 2016) among the participants. Based on the above, the following hypothesis is proposed:

H1: The dimensions of competence, autonomy, relatedness and enjoyment are dimensions of the experience of participation in a gamification program.

Self-efficacy is very important in the adoption of regular sports or exercise practice because people with a low perception of self-efficacy may avoid carrying out a given

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

task or settle for inferior results, while those who perceive a high level of self-efficacy are able to get fully involved in the activity, make more effort, spend more time engaging with it and take on greater challenges (Bandura, 1989; Banfield and Wilkerson, 2014; Schwarzer *et al.*, 1997). The higher the level of perceived self-efficacy, the greater the effort invested by the individual, who is convinced of being able to reach his or her goal (Wood and Bandura, 1989).

The literature notes that a person's perception of self-efficacy can be improved through gamification (Dewett, 2007; Pavlas *et al.*, 2010; Richter *et al.*, 2015). Bandura (1986) notes that one's perception of self-efficacy depends on several factors, such as the difficulty of the task, the amount of effort invested in performing it, the amount of external help one has received to perform it, the characteristics of the situation in which it is performed, one's state of mind when performing it and one's physical state at the time.

Gamification employs various elements that can contribute to improving perceptions of such aspects, as it provides continual feedback that motivates the participant via their use of features such as: progress bars, points, challenges, badges, leaderboards, levels, achievements and the means to share these achievements in social networks (Bandura, 1982; Scheiner and Wit, 2013).

One's perception of self-efficacy is also determined by the objective one sets, the level of commitment to this objective and the result one expects to achieve based on the effort expended (Bandura, 1989). On this point, it is further proposed by the literature that, to intensify self-efficacy in a gamification program, to start with the player must master the easiest challenges, and then, as the game progresses, the level of difficulty must gradually increase. This sense of progress heightens the user's perception of self-efficacy (Scheiner and Wit, 2013). The analysis of intrinsic interest, based on the theory of self-determination (Deci and Ryan, 1985), holds that the interest grows out of the perceived self-efficacy the user gains from their performance in attempting to attain certain goals (Bandura, 1982).

Meanwhile, enjoyment has also been found to be manifested through the perception of self-efficacy (Dewett, 2007; Pavlas *et al.*, 2010) and it can be fostered by participating in a gamification experience. In the context of practicing exercise or sports, the literature finds that individuals who experience greater enjoyment achieve a higher level of perceived self-efficacy, identifying a positive relationship between the two variables (Dishman *et al.*, 2005; Gençay *et al.*, 2016; Hu *et al.*, 2007; Robbins *et al.*, 2004).

Based on these findings, it seems logical to assume that the experience of participating in a gamification program will contribute to the perception of greater self-efficacy among users. The following hypothesis is therefore proposed:

H2: The experience of participating in a gamification program exerts a positive and significant influence on perceived self-efficacy.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

2.3. The moderating effect of the socio-demographic variables of the participant

Literature specializing in sports has examined different types of variable that influence participant behavior, such as motives (e.g. health, freedom, social experience, fun, and performance enhancement) (Borgers *et al.*, 2015), experience (e.g. both novice and experienced runners), consumer acceptance of wearable sports technology (e.g. Aksoy, Alan, Kabadayi and Gebze, 2020; Kim and Chiu, 2019) or socio-demographic characteristics (Hallmann and Wicker, 2012; Haro-González *et al.*, 2018; Vos *et al.*, 2014).

Among the socio-demographic variables, gender and age are considered critical in routine exercise or sporting activity (e.g. Greenwell *et al.* 2015; Hallmann and Wicker, 2012; Haro-González *et al.*, 2018; Molanorouzi, Khoo and Morris, 2015; Vos *et al.*, 2014), in the use of fitness apps and watches (wearable devices) (Janssen *et al.*, 2017), in gamification (Conaway and Cortés-Garay, 2014) and in perceived self-efficacy (Gençay *et al.*, 2016, Schwarzer *et al.*, 1997). However, there is no consensus in the literature regarding the effects of gender and age on different variables linked to sporting activity (e.g. Conaway and Cortés-Garay, 2014; Greenwell *et al.*, 2015; Hazari, 2018; Janssen *et al.*, 2017; Molanorouzi *et al.*, 2015; Zurita-Ortega *et al.*, 2018).

The literature does acknowledge that there are gender differences in terms of decision-making processes (Li and Chang, 2016; Zhang *et al.*, 2009) and in the motivational strategies used to tackle new learning (Hederich-Martínez *et al.*, 2018; Whittingham, 2017). These differences are a reflection of the internal mechanisms that influence people's behaviors, including in relation to the adoption of habitual sporting practice (Zurita-Ortega *et al.*, 2018). On this point, some researchers have identified gender associations with goal orientations—task orientation often being stronger among women (Erturan-Ilker, Yu, Alemdaroglu and Köklü, 2018; Litalien, Morin and McInerney, 2017). For instance, in the context of education, a task orientation is associated with intrinsic motivation for learning and tends to be expressed more strongly by female students (Keegan, Harwood, Spray and Lavallee, 2014). In the context of sports practice, Morris, Clayton, Power and Han (1995) found that achieving a good level of health was rated as being more highly motivating among females than males, while status was found to be more important for males than females.

More specifically, women tend to be oriented toward intrinsic motivation (which is emphasized by gamification), while men focus on more extrinsic motivation (which is more utilitarian in nature and geared to achieving more instrumental results). This scenario means that, before taking on a task, for women the level of effort (Hederich-Martínez *et al.*, 2018), the level of achievement (Whittingham, 2017) and being able to relate to other participants (Whittingham, 2017; Zhang *et al.*, 2009) are all more important than for men. Furthermore, they are all behaviors that are reinforced by participating in a gamification program, thanks to elements that remind the participant of their ability to make decisions related to their goals, obtain feedback

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

about their level of achievement and enable them to interact with other participants, among other possible features. These elements will influence the person's intrinsic motivation and, as a consequence, can strengthen their perceived self-efficacy in practicing sport or exercising routinely. Therefore, on the premise that women are more orientated toward intrinsic motivation than men, the experience of participating in gamification could be more effective for women than for men, leading to greater results of participation among women in terms of achieving greater perceived self-efficacy than men.

This calls for a greater understanding of the moderating effect of gender in the relationship between participation in gamification and perceived self-efficacy in routine exercise or sport. To date, the literature has not analyzed whether the effect of participation in gamification (measured from the perspective of how the participant experiences it) on perceived self-efficacy is moderated by the person's gender. It is, therefore proposed that:

H3: The effect of participating in a gamification program on perceived self-efficacy is different between the gender groups.

With regard to the question of age, it has been found that sports practice declines significantly with age (Casperson, Pereira and Curran, 2000; Guthold, Ono, Strong and Chatterji, 2008). However, Donahue *et al.* (1980) and Dorfberger *et al.* (2009) found that participation in a sports or exercise program may have a greater impact on older than on younger participants.

According to the literature, age differences have been identified relating to decision-making processes and the various strategies that people employ to motivate themselves to practice sports regularly. In this regard, some researchers have identified that maintaining or improving physical appearance motivates younger adults to be physically active, because physical appearance is an important component in many societies and many cultures. In contrast, older adults are more involved with evaluating their lives and searching for meaning. The result of these evaluations shows that older adults can feel better and find greater meaning in their lives if they improve their physical fitness (Kolt, Driver and Giles, 2004; Renner, Spivak, Kwon and Schwartzer, 2007; Wilcox, Tudor-Locke and Ainsworth, 2002). Given that this evaluation process is a psychological task, we predict that older participants will exhibit more, and deeper, concern for consequences related to the practice of sport and their psychological health than younger adults, which will lead to older people achieving greater intrinsic motivation than younger people.

More specifically in relation to the support that participating in a sport and exercise-based gamified program can provide, the following aspects that differentiate the behavior of younger and older people can also be considered. Older participants may be more receptive to such a program due to their increased developmental capacity for learning. In addition, it was found that, in older age, decisions requiring a high level of involvement are usually made more positively (Fayolle *et al.*, 2011), there is a

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

greater reluctance to go back on decisions, once made (Kautonen *et al.*, 2011; Lévesque and Minniti, 2006), and there is a greater level of engagement with the behavior being developed, even when the individual starts off from a poorer state of preparedness compared to that of other, younger people (Miralles *et al.*, 2017).

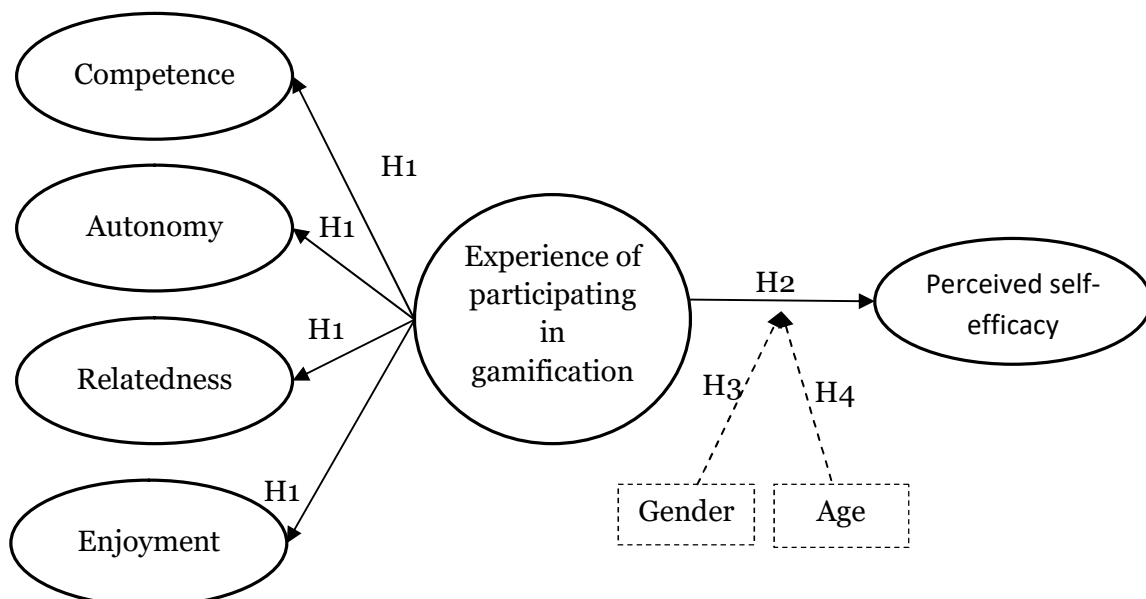
In sum, gamification is designed to generate a high level of intrinsic motivation, via dimensions such as competence and autonomy. These dimensions are linked to a greater involvement with the decisions adopted (a feeling that is reinforced when participating in a gamification program that includes elements that remind the participant of their ability to make and maintain their decisions), greater engagement and greater learning capacity relative to the activity undertaken (a feeling that is reinforced by participating in a gamification program that includes elements that provide feedback to the participant about their level of achievement in their chosen exercise or sporting activity). These internal experiences can ultimately lead the individual to achieve greater self-efficacy in that activity.

The moderating effect of age in the relationship between participation in gamification and perceived self-efficacy in routine exercise or sport therefore needs to be better understood. The extant scholarship has yet to analyze whether a person's age moderates the effect of participation in gamification (measured in terms of how they experience it) on perceived self-efficacy. Based on this premise, it is proposed that:

H4: The effect of participating in a gamification program on perceived self-efficacy is different between younger and older people.

Figure 1 shows the set of relationships between the constructs addressed in our study and the moderating effect of the participant's gender and age.

Figure 1. Proposed research model



3. Methodology

3.1. Population and sample

The study participants had to fulfill three conditions: being users of a smartband when practicing sports or exercising, not presenting any chronic health problems that might restrict their ability to practice sports; and they had to be resident in Spain. This last requirement was included to maximize the likelihood that, as residents, they would all have a similar level of easy local access to public facilities and programs designed to support regular physical exercise and sport (Spanish Ministry of Education, Culture and Sport, 2018).

Among the different smart devices available, smartbands stand out for their popularity (Castelnuovo *et al.*, 2014; IPSOS, 2017, 2020). According to the latest statistics accessed for the present study, 19% of the population use a smartband when practicing sports, this being the country with the second-highest penetration of this type of device in the general population, behind only the United States. In terms of the gender divide in smartband use, this is practically non-existent, and the age divide is becoming increasingly small (IPSOS, 2017, 2020).

Participants were selected by means of an Internet user panel managed by Survey Sampling Spain S.L. (part of Survey Sampling International, or SSI). The rationale for this choice was two-fold. First, SSI has won several awards for results and rigor in the market research field. The firm has over 30 offices in over 20 countries; it has 17 million panelists from 90 countries on its books; and, in 2016 alone, it successfully completed 40 million surveys across 60,000 projects. By controlling the characteristics of individuals within the sample, SSI has created an online sample that is consistent when measured by comparison with external benchmarks, including telephone sample studies. Second, the SSI panel comprises over 300,000 users in Spain.

In the present study, the final sample comprised 233 cases recruited in September 2016 via a self-administered questionnaire organized by an online panel. According to their socio-demographic characteristics (Table 1), the typical smartband user can be defined as an adult aged between 30 and 44 years, with higher education qualifications and paid work, this profile being similar to that of other studies focusing on the use of wearable devices for routine sporting activity (Kim and Chiu, 2019; Song *et al.*, 2018). In terms of sports practice, the majority of the sample (59.04%) practiced regularly between 4 and 6 times a week; and, of these participants, 82.72% did so at moderate intensity. Finally, regarding the use of smartbands (Table 1), most of the sample had been using one for at least a month (83.75%), and they wore it every time (or almost every time) they played sport or exercised (80.46%). An average difference test was conducted for independent samples to verify that the length of time individuals had been using their smartband did not generate significant differences in the sample. Among the sample's favorite

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

sports and forms of exercise were aerobics (such as walking, running or cycling) at a frequency of 3 to 5 days a week at moderate intensity.

Table 1. Description of the sample profile

Sociodemographic variables			Psychographic variables		
Variable		Percentage (%)	Variable		Percentage (%)
Gender	Male	51.36	Frequency with which they practice sport/exercise each week	1–3 days	28.41
	Female	48.64		4–6 days	59.04
Age	18–29 years	24.56	Intensity with which they exercise	Every day	12.55
	30–44 years	53.63		Low	9.55
	45–65 years	20.45	Moderate	82.72	
	More than 65 years	1.36	High	7.73	
Qualification level	No secondary qualifications	1.82	Experience of using a smartband	Less than a month	16.25
	Secondary/ further education	30.91		1–3 months	26.56
	Higher education	67.27		3–6 months	31.73
Over 6 months				25.56	
Employment status	In paid work	82.73	Frequency with which they use a smartband when practicing sport/exercise	Always	33.64
	Unemployed	5.46		Almost always	46.82
	Student	6.36		Occasionally	19.54
	Retired	1.82		Never	0
	Homemaker	3.63			

3.2. Measurement scales

Based on the literature review, the variables that needed to be considered in the participant’s experience of gamification were identified (Appendix 2). These were intrinsic motivation (competence, autonomy and relatedness) and enjoyment. To measure each of these variables, scales previously validated by the literature were used. To measure competence, autonomy and relatedness, the scales developed by Lieberoth (2015) were used; and to measure enjoyment, the scale proposed by in

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

Hamari and Koivisto (2015a) was chosen. The perceived self-efficacy variable was measured on the scale proposed by Jones (1986).

Individuals responded on a 7-point Likert scale, where 1 equaled 'entirely disagree' and 7 equaled 'entirely agree'. The questionnaire also included the socio-demographic variables of gender and age.

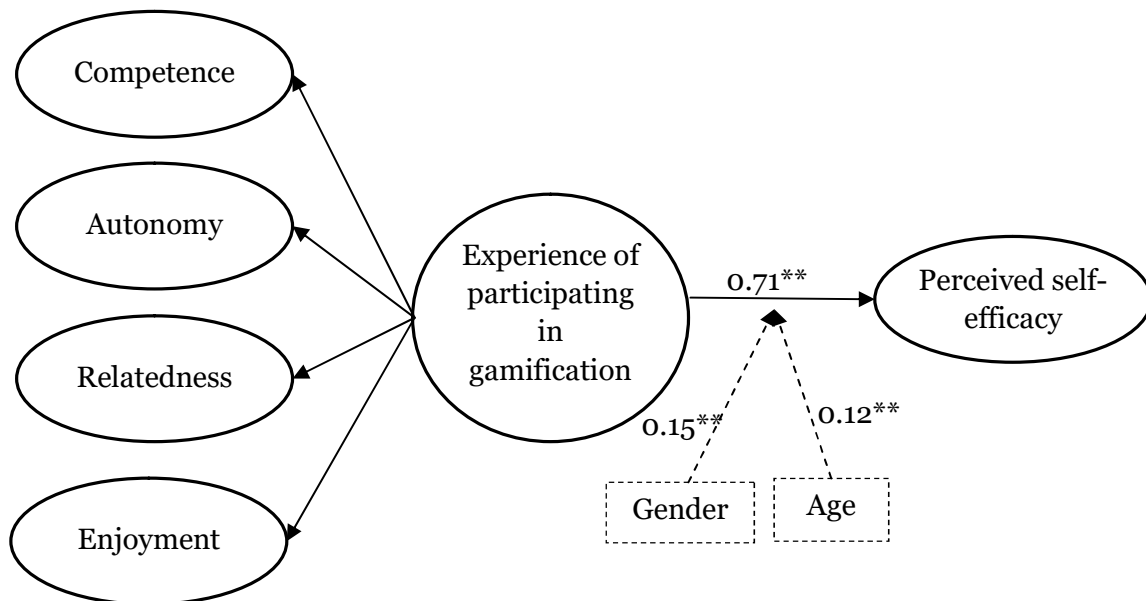
3.3. Analysis strategy

Figure 2 shows that 'the experience of participating in a gamification program' is a second-order construct made up of the dimensions 'Competence', 'Autonomy', 'Relatedness' and 'Enjoyment'. Meanwhile, 'perceived self-efficacy' is a first-order construct, while the variables that reflect the interaction effect with the gamification experience ('Experience of participating in a gamification program' x 'Gender' and 'Experience of participating in a gamification program' x 'Age') are directly observable.

The structural equation modeling (SEM) methodology was deemed the most appropriate, given that the research model includes latent variables that are not directly observable (Hair, Black, Babin and Anderson, 2014, pp. 541–591). SEM is a multivariate analysis technique widely used for this type of test and it brings together methodological techniques that have been perfected over time and developed in various disciplines (Hair et al., 2014, pp. 541–591). SPSS 21 and AMOS 21 data analysis software was therefore used to examine descriptive statistics and the factor structure of the proposed scales, and the hypotheses were tested using SEM. SEM allowed us to perform validation tests on the measurement scales (which requires the adequate reliability and validity of the scales to be shown, to provide empirical evidence in relation to H1) and then test the relationships between the variables of the research model (to provide empirical evidence in relation to H2, H3 and H4).

First, the psychometric properties of the proposed model were estimated and evaluated. Since the Chi-square test of multivariate normality of the variables included in the proposed model was significant, it was appropriate to undertake the estimation using the maximum likelihood method combined with the bootstrap method (Yuan and Hayashi, 2003). Even applying this technique, the Chi-square value remained significant. The fact that the results of the Chi-square were significant was due to its being sensitive to sample size. In this case, a valid reference was the value of Normed Chi-square, which gave a value of 2.46 and was within the limits recommended by the literature. As regards the overall fit of the model, the RMSEA value (0.07) was acceptable, below the recommended limit (Figure 2). The incremental fit measurements CFI (0.95), IFI (0.94) and TLI (0.95) were also acceptable. In its totality, the fit of the model can be said to be acceptable (Figure 2).

Figure 2. Outline of results from the proposed research model



Note: Value: standardized coefficient. ** $p < 0.01$; * $p < 0.05$; Goodness-of-fit indicators: CMIN/DF= 2.46; RMSEA=0.07; CFI=0.95; IFI=0.94; TLI=0.95.

4. Results

The dimensions included in a variable reflect the composition of the scale when their validity and reliability can be confirmed (Devlin *et al.*, 1993). To achieve this, the standardized loadings, the individual reliability coefficient (R^2), the confidence interval and the significance of each of the items included must be analyzed (Table 2). The results led to the items competence 3 and autonomy 3 being eliminated as they presented individual reliability (R^2) lower than the minimum reference value of 0.50. These items were thus excluded as this helped to achieve an improved statistical fit for the model (Bagozzi *et al.*, 1979). Once these two items had been eliminated, the individual reliability of the rest of the items included in the model was above or close to the reference threshold of 0.05 (Hair *et al.*, 2014, pp. 541–591). On this basis, the refining process was then stopped.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

Table 2. Standardized coefficients and individual reliability of the items

Factor	Standardized coefficients and confidence interval	Individual reliability (R²) and confidence interval
First-order confirmatory factor model		
Competence		
COMPETENCE 1. I'm satisfied with my performance in the activities set for me by this smartband.	0.84 (0.77; 0.95) p<0.002	0.71 (0.59; 0.80) p<0.002
COMPETENCE 2. I was very good at the activities set for me by this smartband.	0.89 (0.82; 0.94) p<0.001	0.79 (0.68; 0.89) p<0.001
Autonomy		
AUTONOMY 1. I didn't feel obliged to do the activities and challenges set for me by this smartband.	0.55 (0.39; 0.66) p<0.002	0.30 (0.16; 0.44) p<0.002
AUTONOMY 2. I did the activities and challenges set for me by this smartband because I wanted to.	0.76 (0.58; 0.88) p<0.001	0.56 (0.34; 0.78) p<0.001
Relatedness		
RELATEDNESS 1. I would like to have the opportunity to interact more often with other users of this smartband.	0.95 (0.92; 0.96) p<0.001	0.89 (0.84; 0.93) p<0.001
RELATEDNESS 2. Other users of this smartband and I would probably become friends if we were to interact a lot.	0.94 (0.87; 0.97) p<0.002	0.89 (0.76; 0.96) p<0.002
RELATEDNESS 3. I feel close to other users of this smartband.	0.92 (0.88; 0.95) p<0.002	0.85 (0.78; 0.90) p<0.002
Enjoyment		
ENJOYMENT 1. This smartband is original.	0.87 (0.81; 0.91) p<0.001	0.76 (0.66; 0.83) p<0.001
ENJOYMENT 2. This smartband is imaginative.	0.87 (0.82; 0.92) p<0.001	0.77 (0.67; 0.84) p<0.001
ENJOYMENT 3. This smartband is unusual.	0.84 (0.78; 0.88) p<0.002	0.70 (0.61; 0.77) p<0.002
ENJOYMENT 4. This smartband is creative.	0.87 (0.82; 0.92) p<0.001	0.76 (0.66; 0.83) p<0.001

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

ENJOYMENT 5. This smartband is flexible.	0.79 (0.71; 0.86) p<0.001	0.63 (0.51; 0.74) p<0.001
Perceived self-efficacy		
PERCEIVED SELF-EFFICACY 1. Using this smartband empowers me to feel more confident in my capacity to practice sports.	0.89 (0.85; 0.93) p<0.001	0.75 (0.66; 0.82) p<0.001
PERCEIVED SELF-EFFICACY 2. Using this smartband empowers me to feel self-assured in terms of my capabilities in sporting activities.	0.91 (0.86; 0.94) p<0.001	0.76 (0.67; 0.84) p<0.001
PERCEIVED SELF-EFFICACY 3. Using this smartband empowers me to master the necessary skills to perform sporting activities.	0.85 (0.79; 0.90) p<0.001	0.70 (0.61; 0.77) p<0.001
Second-order confirmatory factor model		
Experience of participating in a gamification program		
Competence	0.84 (0.70; 0.98) p<0.002	0.71 (0.49; 0.96) p<0.002
Autonomy	0.65 (0.52; 0.75) p<0.001	0.42 (0.28; 0.56) p<0.001
Relatedness	0.93 (0.86; 0.98) p<0.001	0.87 (0.74; 0.97) p<0.001
Enjoyment	0.89 (0.81; 0.94) p<0.002	0.78 (0.67; 0.88) p<0.002

We then verified the internal consistency of each of the dimensions on the first-order scale. Consistency can be measured with composite reliability and variance extracted. In both cases, the values obtained were acceptable, as they were close to (or above) the reference value of 0.70 for composite reliability and 0.50 in the case of variance extracted (ibid.) (Table 3), with the exception of the ‘Autonomy’ dimension, which presented composite reliability and variance extracted below the reference values. Those dimensions showing a value lower than the recommended levels were not removed from the model, given that their removal would not have significantly improved the overall fit of the model and could have adversely affected the validity of the content (ibid.). The results obtained indicated that the set of first-order dimensions proposed to measure each one of the variables (competence, autonomy, relatedness, enjoyment and self-efficacy) was valid, given that it enabled the existence of adequate validity and reliability to be confirmed.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

Table 3. Individual reliability, composite reliability and variance extracted of the dimensions

Variables	Dimensions	Individual reliability (Cronbach's alpha)	Composite reliability	Variance extracted
Experience of participating in a gamification program *			0.90	0.70
	Competence	0.85	0.86	0.75
	Autonomy	0.56	0.60	0.44
	Relatedness	0.95	0.96	0.88
	Enjoyment	0.93	0.93	0.72
Perceived self-efficacy		0.92	0.90	0.75
Note :*Second-order factor.				

As regards second-order constructs, Table 2 shows the standardized loadings, individual reliability, confidence intervals, and the level of significance for each of the first-order dimensions included, as well as the composite reliability and variance extracted for second-order constructs. It can be observed that the 'Relatedness' dimension presents individual reliability levels close to literature reference values. Similarly, the composite reliability and variance extracted values are above the acceptable minimum. Hence, overall, these results indicate that the second-order scale referring to the experience of participating in a gamification program presents a high level of internal consistency.

Finally, the confidence interval test was performed, to check the existence of adequate discriminant validity between the first-order dimensions. According to this test, for discriminant validity to be proven, the value '1' should not be found in the confidence interval of the correlations between the different dimensions of the same level of analysis (Anderson and Gerbing, 1988). The test produced a satisfactory result in this regard.

Overall, the results show that 'Experience of participating in gamification' is reflected via a second-order construct comprising the dimensions 'Competence', 'Autonomy', 'Relatedness' and 'Enjoyment'. This result provides empirical support to H1.

Once the adequacy of the scales used for the measurement of each of the variables had been established, the averages of the items used to measure the interactions between the user's experience of the gamification program and the socio-demographic variables (gender and age) were calculated. To avoid multicollinearity, we focused on the variable "Experience of participating in a gamification program"

and its respective averages (Cohen *et al.*, 2003, pp. 266–7). On the basis of these results, the following aspects are worthy of note:

H2 proposes that how the user experiences their participation in a gamification program exerts a positive influence on perceived self-efficacy. The results show a statistically significant relationship ($p < 0.01$). Furthermore, the effect detected is quite marked (0.71), with a confidence interval of between 0.48 and 0.86. Therefore, there is statistical support for this hypothesis and it can be concluded that participation in a gamification program has a positive effect on perceived self-efficacy (Figure 2).

There are two significant interaction effects on perceived self-efficacy. Specifically, the coefficient of the interaction between gender and the experience of participating in a gamification program is equal to 0.15 ($p < 0.01$), meaning that the experience of participating in a gamification program will have a greater influence on perceived self-efficacy among women than among men. Meanwhile, the coefficient of the interaction between age and participation in gamification is equal to 0.12 ($p < 0.01$). This implies that the experience of participating in a gamification program has an increasing influence on perceived self-efficacy as age rises. These findings provide empirical support for H3 and H4 (Figure 2).

5. Discussion

One of the major challenges faced by advanced societies is the growing sedentarism of the population, which calls for mechanisms to help people adopt habits of regular physical exercise (WHO, 2014; Warner, 2019). The present study offers insights into the use of gamification as such a mechanism—an approach that encourages the adoption of sports and exercise as a regular habit through the potential of smart devices (such as smartbands), which include gamification features (Kim and Chiu, 2019; Song *et al.*, 2018).

Gamification techniques have been pervasively adopted in many industries, including the sport industry (Tu *et al.*, 2019; Baptista and Oliveira, 2017; Hamari and Koivisto, 2015a; Müller-Stewens, Schlager, Häubl and Herrmann, 2017). In the present study, the participant's experience of a gamification program was analyzed and its dimensions identified, along with its effect on perceived self-efficacy, which is considered a key variable and a good predictor of the adoption of regular sports or exercise habits (Dadaczynski *et al.*, 2017; Litman *et al.*, 2015). The moderating effect of gender and age on the effects of participating in the gamification experience on perceived self-efficacy was analyzed.

Specifically, most of the current studies mainly focus on whether or not gamification can help increase participation in sport and exercise activity. Studies dealing with health management have even provided strong empirical evidence suggesting that gamified wearable sport devices can promote physical activity or sport participation more effectively, compared with other programs without game elements (e.g. Chung,

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

Skinner, Hasty, and Perrin, 2017; Hamari and Koivisto, 2015a; Lee and Cho, 2017). However, these studies have not addressed the potential difference in effectiveness from the perspective of the user and their experience of participating in a gamified program.

In the present study, it can be drawn is that participation in a gamification program generates an experience that is intrinsically motivating (comprising the dimensions of competence, autonomy and relatedness) and enjoyment. This contributes empirical evidence to the theoretical approach proposed by Merhi (2016). Specifically, our study found that a gamified program can successfully create intrinsically motivating and enjoyment experiences. These results are consistent with the previous literature in the sense that both motivation and enjoyment have been found to be very important elements for sports or exercise (e.g. Molanouruzi *et al.*, 2015; Zurita-Ortega *et al.*, 2018) and, according to the present study, are component factors of the experience of participating in a gamified program. This result contributes by providing a deeper understanding of the role of gamification in helping consumers to stay physically active in their daily lives, and the internal mechanisms it employs to achieve successful results.

Second, the present study analyzed whether the use of gamification can be considered an adequate strategy for participants to perceive greater self-efficacy when they practice sports or exercise. Perceived self-efficacy is considered a powerful variable in relation to the intention to undertake sport or exercise. The results show that the experience of participating in a gamification program positively influences perceived self-efficacy, demonstrating the suitability of gamification in terms of its capacity to foster healthy habits of regular activity.

Although the antecedents to maintaining the practice of sport or exercise are highly complex (Standage, Gillison, Ntoumanis and Treasure, 2012), one promising approach is to focus on intrinsic motivation and enjoyment because this is a key factor that influences individuals' initiation and maintenance of behavior (Hagger and Chatzisarantis, 2008). Participation in a gamified program not only affects the practice of sport or exercise itself, but is also a critical factor in keeping that activity up consistently, through intrinsic motivation, as determined by self-determination theory (André and Dishman, 2012; Molanouruzi *et al.*, 2015). These findings are in line with those of Dewett (2007), Pavlas *et al.* (2010) and Richter *et al.* (2015) in other spheres of application. The present results also provide added value to the work of Dishman *et al.* (2005), Gençay *et al.* (2016), Hu *et al.* (2007) and Robbins *et al.* (2004), as these authors study only enjoyment as an antecedent of perceived self-efficacy.

Finally, the literature acknowledges the importance of using socio-demographic variables to segment the population and identify the most advantageous actions with respect to each sub-group. Among the possible socio-demographic variables, gender and age stand out because of their impact on sport- and exercise-adoption. As such, they are variables of great interest in the literature, as they enable the identification of

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

segments (such as women and older adults) for whom the literature calls for greater scholarly attention (e.g. Ferrand, Nasarre, Hautier and Bonnefoy, 2012; Molanouruzi *et al.*, 2015; Stephan, Boiché and Le Scanff, 2010; Zurita-Ortega *et al.*, 2018). In this paper, the moderating effect of the gender and age variables on the relationship between the individual's experience of gamification and perceived self-efficacy has been shown.

Regarding gender specifically, the results show that the outcomes derived from participating in the gamification experience are more effective for women than for men—a finding that is in line with previous research that indicated that women are more oriented toward intrinsic motivation than men. These previous studies also found that women give special importance to the level of effort required (Hederich-Martinez *et al.*, 2018), the level of achievement (Whittingham, 2017) and relationships with other participants (Whittingham, 2017; Zhang *et al.*, 2009). In sum, these studies indicate that, given that women tend toward intrinsic motivation (Stephan, Boiché and Le Scanff, 2010; Zurita-Ortega *et al.*, 2018), gamified programs are likely to have a greater effect on them than on men. The present study goes a step further by testing the effect of these gamified programs on self-efficacy and demonstrating that their greatest effect indeed does occur among women.

Turning to age, in relation to the older adult collective, as we have seen there is a tendency to abandon sport and exercise as the years go by (Ferrand, Nasarre, Hautier and Bonnefoy, 2012; Molanouruzi *et al.*, 2015). In other words, older people present a low level of adherence to routine sports and exercise; and this, together with the progressive aging of the population in advanced countries, renders it more necessary than ever to identify effective strategies for encouraging older people to take up regular sports or exercise (WHO, 2014; Warner, 2019).

The literature also shows that the practice of sport or exercise among older people is linked to deeper and more intrinsic motivations, compared to those of younger people (e.g. Kolt, Driver and Giles, 2004; Renner, Spivak, Kwon and Schwartzer, 2007). As participation in a gamified program has been shown to affect intrinsic motivation (e.g. Hamari *et al.*, 2014), and older people present greater intrinsic motivation, the present study contributes to the literature by verifying that gamification exerts a greater effect on perceived self-efficacy among older people. This research further contributes by showing that characteristics more typical of older people—such as taking high-involvement decisions more positively (Fayolle *et al.*, 2011) or greater engagement in the newly-acquired behavior, even when starting out from a weaker position to begin with, compared to younger people (Miralles *et al.*, 2017)—contribute to being more receptive to the positive outcomes of the gamification experience.

These results highlight the appropriateness of gamification for these two collectives, women and older people, given that it can contribute to their perception of greater self-efficacy, which in turn will help them build their intention to sustain their efforts in practicing sport and exercise habitually. Identifying the factors that contribute to

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

increasing the adoption of sports or exercise among these collectives is important, since it helps to guide future lines of research dealing with the development and design of intervention programs to improve sport or exercise take-up across the population.

5.1. Theoretical implications

The literature shows an interest in better understanding the effectiveness of gamification in helping achieve behavioral change among participants (e.g. Hamari *et al.*, 2014; Tu *et al.*, 2019). More research is required to show the effects of gamification in specific areas (e.g. Hamari *et al.*, 2014; Seaborn and Fels, 2015; Tu *et al.*, 2019), such as the adoption of sports and exercise habits. When the design of a gamification experience is analyzed in the context of sports or exercise, rather than focusing only on the game elements, it is essential to evaluate the degree of intrinsic motivation and enjoyment perceived by the participant.

The results of this study highlighted that participation in gamified experiences can help the population to adhere to sports or exercise activity (by achieving greater perceived self-efficacy), and that the level of adherence is greater among those groups within the wider population that typically present fewer habits of sport or exercise practice—that is, women and older adults.

5.2 Implications for practitioners

The results of this study offer some interesting implications for individual users and for those professionals and institutions involved in promoting the adoption of, regular sport and exercise in society. The latter, for example, need to identify strategies to make the experience of practicing sports more meaningful for users (Cepeda-Carrión and Cepeda-Carrión, 2018; Molanouruzi *et al.*, 2015; Zurita-Ortega *et al.*, 2018). One possibility proposed in this study is to take advantage of the potential of wearable technology such as smartbands.

First, in terms of the implications for consumers, sustaining participation in sporting activity or exercise can reduce health risks and increase their well-being (Kumar, Manoli, Hodgkinson and Downward, 2018). However, although consumers are well aware of the benefits of exercising, many of them fail to persist. To address this, some consumers wear a smartband (or a similar wearable devices) to help them stick to exercise and achieve their personal health goals.

The results of this study indicate that the choice of gamified wearable devices should respond to the intrinsic motivations of each person and their sense of enjoyment. That is, given that participation in a gamified experience affects the intrinsic motivation and enjoyment of the participant, and that intrinsic motivation changes, among other factors, according to age and gender, the consumer should choose their model of smartband, from all those available on the market, according to the possibilities that the device offers to achieve intrinsic motivation and enjoyment.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

Second, turning to the implications for professionals, as Rowe, Molanouruzi *et al.* (2015), Shilbury, Ferkins and Hinckson (2013) and Zurita-Ortega *et al.* (2018) noted, investigation is called-for into the work of professionals and institutions involved in promoting the adoption of regular sport and exercise in the population at large, to identify opportunities to engage consumers more effectively in participating in sport or exercise.

Findings from the present study suggest that it is of interest to examine gamification design in terms of its suitability, as an effective gamification experience requires more than simply a system that features game elements. In order to evaluate its effectiveness, the participant's perspective must be adopted, to ensure that the experience is capable of generating a sense of competence, autonomy and relatedness, as well as enjoyment. This criterion is useful for those responsible for gamification programs, because it allows them to test the suitability of the design.

For instance, sport and exercise interventions should be orientated toward creating an intrinsically motivational and enjoyment atmosphere that helps develop positive experiences of practicing sports or exercise (Molanouruzi *et al.*, 2015; Zurita-Ortega *et al.*, 2018). In this regard, the use of the options provided by smartbands contributes to generating feelings of autonomy (for example through the choice of exercises to be performed, their order, or their degree of difficulty), competence (for example, through the selection of the starting level for which the user shows a sufficient degree of mastery, and the feedback that the device can give the user as they achieve the objectives of the exercise session), relatedness (via the possibilities the device offers users to share their achievements and interact with other participants of the sports program), and enjoyment (based on novel features and surprises that the application can offer the user).

It has also been found that the use of gamification is an appropriate strategy for promoting routine sporting activity and exercise, via the variable of perceived self-efficacy. Therefore, if the aim is to design a campaign or program to promote healthy routine activity such as sport or exercise, the use of smartbands and their associated gamification would be a good option, as it can help participants perceive themselves as having greater self-efficacy in their sports or exercise routine, which fosters a greater intention to keep practicing the activity.

Finally, market segmentation has become a valuable instrument in planning appropriate market strategies, as it can help identify the most suitable programs for each target (Mok and Iverson, 2000). This is of major importance in the context of the present findings, given that the offer aimed at each target public could be adjusted to encourage even greater perceived self-efficacy in sports and exercise practice. Such an approach may make it possible to improve users' adherence to regular sports or exercise among collectives that typically present a low take-up in such physical activities (Molanouruzi *et al.*, 2015; Zurita-Ortega *et al.*, 2018).

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

It has been found that smartbands and their gamification features are capable of increasing perceptions of self-efficacy among groups that are characterized by being typically less active in the realm of sports and exercise, namely women and older people (European Commission, 2018; Spanish Ministry of Education, Culture and Sports, 2018). These results are highly relevant for the development of programs to promote take-up of routine sports and exercise among specific groups, based on gender and age, which can help rectify the imbalance among the collectives of women and older people. Both groups present opportunities to persist with sports or exercise, based on a well-designed gamified program that succeeds in encouraging intrinsic motivation and enjoyment among participants. One example of this approach is the program developed in Andalusia (Spain) that is supported by smartbands, called ‘Toward a Million Steps’. This program has succeeded in encouraging groups of people (comprising mainly women and the elderly) to adopt regular exercise (Junta de Andalucía, 2020). The success of the program has led to its implementation by the institutions and organisms charged with promoting the adoption of regular sport and exercise in the general population across the region of Andalusia from 2008 to the present day, with participation often exceeding 2,000 people in each annual edition.

5.3 Limitations and future lines of research

As with all empirical studies, this study presents certain limitations that may point to possible lines of research for the future. One such limitation is that only those variables considered to be the most relevant for the study’s objectives were included in the research model. In this regard it would be of interest to study the moderating effect of other variables among the participants that may influence their perceived self-efficacy when practicing sports or exercise, such as their interests, lifestyle or the objectives they pursue when practicing sports.

On the one hand, it would also be interesting to identify the variables that may be relevant to individuals’ development of a regular sports or exercise practice. These could include variables relating to socio-demographics, infrastructure, and environmental programs for sports practice, as well as those relating to the inspiration that other people who practice sports may provide.

On the other hand, while the empirical study was conducted on a population in which gender and age divides in the use of wearable devices are virtually non-existent or very small, it would be interesting to carry out this study in contexts in which there is a greater digital divide (gender- and age-based). This could determine whether the use of smartbands combined with gamification constitutes an adequate strategy with which to promote the regular practice of physical exercise and sport among different groups in society. Other studies could examine whether the use of smartbands together with gamification features may be useful in reducing the digital divide that may exist between genders and ages (in addition to any such divide that may exist in terms of practicing regular physical exercise and sport).

A further future line of research would be to approach the proposed research model in the context of another geographical area. Applying our model to other geographical areas would enable us to corroborate whether it can be generalized more widely, together with the results obtained. This would contribute to extending the knowledge base regarding gamification and its application in the context of acquiring healthy sports and exercise habits.

6. References

- Ahn, T., Ryu, S. and Han, I. (2007), “The impact of web quality and playfulness on user acceptance of online retailing”, *Information & Management*, Vol. 44, pp. 263–275.
- Ajzen, I. (2002), “Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior”, *Journal of Applied Social Psychology*, Vol. 32, No. 4, pp. 665–683.
- Aksoy, N.C., Alan, A.K., Kabadayi, E.T. and Aksoy, A. (2020), “Individuals’ intention to use sports wearables: the moderating role of technophobia”, *International Journal of Sports Marketing and Sponsorship*, Vol. 21, No. 2, pp. 225-245.
- Anderson, J.C. and Gerbing, D.W. (1988), “Structural equation modeling in practice: A review and recommended two-step approach”, *Psychological Bulletin*, Vol. 103, No. 3, pp. 411–423.
- André, N. and Dishman, R. (2012), “Evidence for the construct validity of self-motivation as a correlate of exercise adherence in French older adults”, *Journal of Aging and Physical Activity*, Vol. 20, No. 2; pp. 231–245.
- Aroean, L. (2012), “Friend or foe: In enjoying playfulness, do innovative consumers tend to switch brand?”, *Journal of Consumer Behaviour*, Vol. 11, No. 1, pp. 67–80.
- Bagozzi, R.P., Tybout, A.M., Craig, S., and Sternthal, B. (1979), “The construct validity of the tripartite classification of attitudes,” *Journal of Marketing Research*, Vol. 16, No. 1, pp. 88-95.
- Bandura, A. (1977), “Self-efficacy: Toward a unifying theory of behavioral change”, *Psychological Review*, Vol. 84, No. 2, pp. 191.
- Bandura, A. (1982), “Self-efficacy mechanism in human agency”, *American Psychologist*, Vol. 37, No. 2, pp. 122.
- Bandura, A. (1986), “The explanatory and predictive scope of self-efficacy theory”, *Journal of Social and Clinical Psychology*, Vol. 4, No. 3, pp. 359–373.
- Bandura, A. (1989), “Human agency in social cognitive theory”, *American Psychologist*, Vol. 44, No. 9, pp. 1175.
- Bandura, A. (1998), “Health promotion from the perspective of social cognitive theory”, *Psychology and Health*, Vol. 13, No. 4, pp. 623–649.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

- Banfield, J. and Wilkerson, B. (2014), “Increasing student intrinsic motivation and self-efficacy through gamification pedagogy”, *Contemporary Issues in Education Research (Online)*, Vol. 7 ,No. 4, pp. 291.
- Baptista, G. and Oliveira, T. (2017), “Why so serious? Gamification impact in the acceptance of mobile banking services”, *Internet Research*, Vol. 27, No. 1, pp. 118-139.
- Beard, J. and Ragheb, M. G. (1983), “Measuring leisure motivation”, *Journal of Leisure Research*, Vol. 15, No. 3, pp. 219–228.
- Borgers, J., Vos, S. and Scheerder, J. (2015), “Trends and Governance in Running”, In: Scheerder, J., Breedveld, K. and Borgers, J. (eds), *Running Across Europe: The Rise and Size of One of the Largest Sport Markets*. Belgium (Flanders): Basingstoke Palgrave Macmillan, pp. 28–58.
- Casperson, C., Pereira, M. and Curran, K. (2000), “Changes in physical activity patterns in the USA, by sex and cross-sectional age”, *Medicine & Science in Sports & Exercise*, Vol. 32, pp. 1601–1609.
- Castelnuovo, G., Manzoni, G.M., Pietrabissa, G., Corti, S., Giusti, E., Molinari, E. and Simpson, S. (2014), “Obesity and outpatient rehabilitation using mobile technologies: The potential mHealth approach”, *Psychology for Clinical Settings*, Vol. 5, pp. 559.
- Cepeda-Carrión, I. and Cepeda-Carrión, G. (2018), “How public sport centers can improve the sport consumer experience”, *International Journal of Sports Marketing and Sponsorship*, Vol. 19, No. 3, pp. 350-367.
- Chung, A.E., Skinner, A.C., Hasty, S.E and Perrin, E.M. (2017), “Tweeting to health: A novel mHealth intervention using Fitbits and Twitter to foster healthy lifestyles”, *Clinical Pediatrics*, Vol. 56, No. 1, pp. 26-32.
- Cohen, J., Cohen, P., West, S.G. and Aiken, L.S. (2003), *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* (Third Edition), New Jersey: Lawrence Erlbaum Associates Publishers.
- Conaway, R. and Cortés-Garay, M. (2014), “Gamification and service marketing”, *SpringerPlus*, Vol. 3, pp. 363.
- Csikszentmihalyi, M. (2008), *Flow: The psychology of optimal experience*, New York, Harper Perennial.
- Curran, T., Hill, A.P., Hall, H.K. and Jowett, G.E. (2015), “Relationships between the coach-created motivational climate and athlete engagement in youth sport”, *Journal of Sport and Exercise Psychology*, Vol. 7, pp. 193–198.
- Dadaczynski, K., Schiemann, S. and Backhaus, O. (2017), “Promoting physical activity in worksite settings: Results of a German pilot study of the online intervention Healingo fit”, *BMC Public Health*, Vol. 17, No. 1, pp. 696.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

- Deci, E.L., Koestner, R. and Ryan, R.M. (1999), “A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation”, *Psychological Bulletin*, Vol. 125, No. 6, pp. 627–688.
- Deci, E.L. and Ryan, R.M. (1985), *Intrinsic Motivation and Self-determination in Human Behavior*, New York: Plenum Press.
- Deterding, S., Dixon, D., Khaled, R. and Nacke, L. (2011), *From game design elements to gamefulness: Defining gamification*, Proceedings of the 15th International Academic Mindtrek Conference: Envisioning Future Media Environments. ACM, pp. 9–15.
- Devlin, S.J., Dong, H.K. and Brown, M. (1993), “Selecting a scale for measuring quality”, *Marketing Review*, Vol. 5, No. 3, pp. 12–17.
- Dewett, T. (2007), “Linking intrinsic motivation, risk taking, and employee creativity in an R&D environment”, *R&D Management*, Vol. 37, No. 3, pp. 197–208.
- Dishman, R.K., Motl, R.W., Saunders, R., Felton, G., Ward, D.S., Dowda, M. and Pate, R.R. (2005), “Enjoyment mediates effects of a school-based physical-activity intervention”, *Medicine and Science in Sports and Exercise*, Vol. 37, No. 3, pp. 478–487.
- Donahue, J.A., Gillis, J.H. and King, K. (1980), “Behavior modification in sport and physical education: A review”, *Journal of Sport Psychology*, Vol. 2, pp. 311–328.
- Dorfberger, S., Adi-Japha, E. and Karni, A. (2009), “Sex in motor performance and motor learning in children and adolescents: An increasing male advantage in motor learning and consolidation phase gains”, *Behavioural Brain Research*, Vol. 198, pp. 165–171.
- Eppmann, R., Bekk, M. and Klein, K. (2018), “Gameful experience in gamification: Construction and validation of a gameful experience scale (GAMEX)”, *Journal of Interactive Marketing*, Vol. 43, pp. 98–115.
- Erturan-Ilker, G., Yu, C., Alemdaroglu, U. and Köklü, Y. (2018), “Basic psychological needs and self-determined motivation in PE to predict health-related fitness level”, *Journal of Sport and Health Research*, Vol. 10, pp. 91–100.
- European Commission (2018), *Sport and physical activity*, Available at <http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/survey/getsurveydetail/instruments/special/surveyky/2164>.
- Fayolle, A., Basso, O. and Tornikoski, E.T. (2011), *Entrepreneurial commitment and new venture creation: A conceptual exploration*, In Hindle, K. and Klyver, K. (eds), *Handbook of Research on New Venture Creation*. Cheltenham, UK: Edward Elgar Publishing Limited, pp. 160–182.
- Ferrand, C., Nasarre, S., Hautier, C. and Bonnefoy, M. (2012), “Aging and Well-Being in French Older Adults Regularly Practicing Physical Activity: A Self-

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

- Determination Perspective”, *Journal of Aging and Physical Activity*, Vol. 20, pp. 215-230.
- Gençay, Ö.A., Gençay, S., Aydin, E.E., Akkoyunlu, Y. and Demir, G. (2016), “Self-efficacy, physical activity enjoyment and BMI status of Turkish university students”, *Studies on Ethno-Medicine*, Vol. 10, No. 1, pp. 23-27.
- Ghani, J.A. and Deshpande, S.P. (1994), “Task characteristics and the experience of optimal flow in human-computer interaction”, *Journal of Psychology*, Vol. 128, No. 4, pp. 381-391.
- Greenwell, T.C., Hancock, M., Simmons, J.M. and Thorn, D. (2015), “The Effects of Gender and Social Roles on the Marketing of Combat Sport”, *Sport Marketing Quarterly*, Vol. 24, pp. 19-29.
- Guthold, R., Ono, T., Strong, K. and Chaterrji, S. (2008), “Worldwide variability in physical inactivity a 51-country survey”, *American Journal of Preventive Medicine*, Vol. 34, No. 6, pp. 486-494.
- Ha, L., Yoon, Y. and Choi, M. (2007), “Determinants of adoption of mobile games under mobile broadband wireless access environment”, *Informarion & Management*, Vol. 4, No. 3, pp. 276-286.
- Ha, J.P., Kang, S.J. and Ha, J. (2015), “A conceptual framework for the adoption of smartphones in a sports context”, *International Journal of Sports Marketing and Sponsorship*, Vol. 16, No. 3, pp. 2-19.
- Ha, J.P., Kang, S.J. and Kim, Y. (2017), “Sport fans in a “smart sport” (SS) age: drivers of smartphone use for sport consumption”, *International Journal of Sports Marketing and Sponsorship*, Vol. 18, No. 3, pp. 281-297.
- Hagger, M. and Chatzisarantis, N. (2008), “Self-determination theory and the psychology of exercise”, *International Review of Sport and Exercise Psychology*, Vol. 1, No. 1, pp. 79-103.
- Hair, J., Black, W., Babin, B. and Anderson, R. (2014), *Multivariate Data Analysis: A Global Perspective*. Edinburgh Gate: Pearson Education Limited.
- Hallmann, K. and Wicker, P. (2012), “Consumer profiles of runners at marathon races”, *International Journal of Event and Festival Management*, Vol. 3, No. 2, pp. 171-187.
- Hamari, J. and Koivisto, J. (2014), “Measuring flow in gamification: Dispositional Flow Scale-2”, *Computers in Human Behavior*, Vol. 40, pp. 133-143.
- Hamari, J. and Koivisto, J. (2015a), “Why do people use gamification services?”, *International Journal of Information Management*, Vol. 35, No. 4, pp. 419-431.
- Hamari, J. and Koivisto, J. (2015b), “Working out for likes: An empirical study on social influence in exercise gamification”, *Computers in Human Behavior*, Vol. 50, pp. 333-347.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

- Hamari, J., Koivisto, J. and Sarsa, H. (2014), “Does Gamification Work? A Literature Review of Empirical Studies on Gamification”, 47th Hawaii International Conference on System Sciences. IEEE, pp. 3025–3034.
- Haro-González, M., Pérez-Ordás, M., Grao-Cruces, A., Nuviala, R., and Nuviala, A. (2018), “Female users of unisex fitness centres and of fitness centres exclusive for women: satisfaction”, *International Journal of Sports Marketing and Sponsorship*, Vol. 19, No. 4, pp. 384-395.
- Hazari, S. (2018), “Investigating social media consumption, sports enthusiasm, and gender on sponsorship outcomes in the context of Rio Olympics”, *International Journal of Sports Marketing and Sponsorship*, Vol. 19, No. 4, pp. 396-414.
- Hederich-Martínez, C., Camargo-Urbe, A. and López-Vargas, O. (2018), “Motivation and use of learning strategies in students, men and women, with different level of schooling”, *Journal of Psychological and Educational Research*, Vol. 26, No.1, pp. 121–146.
- Hoffman, D.L. and Novak, T.P. (1996), “Marketing in hypermedia computer-mediated environments: Conceptual foundations”, *Journal of Marketing*, Vol. 60, No. July, pp. 50–68.
- Holbrook, M.B. (1994), *The nature of customer value: An axiology of services in the consumption experience*, In Rust, R.T. and Oliver, R.L. (eds), *Service Quality: New directions in theory and practice*. Newbury Park, CA: Sage, pp. 21–71.
- Huotari, K. and Hamari, J. (2016), “A definition for gamification: Anchoring gamification in the service marketing literature”, *Electronic Markets*, Vol. 27, No. 1, pp. 21–31.
- Hu, L., Motl, R.W., McAuley, E. and Konopack, J.F. (2007), “Effects of self-efficacy on physical activity enjoyment in college-aged women”, *International Journal of Behavioral Medicine*, Vol. 14, No. 2, pp. 92–96.
- IPSOS (2017), *El 61% de los usuarios de apps de ejercicio físico creen que su uso les ayuda a mejorar sus hábitos saludables*, Available at: <http://www.ipsos.es/node/173>.
- IPSOS (2020), *Who are the World’s Biggest Wearable Tech Buyers?* Available at: <https://www.ipsos.com/en/who-are-worlds-biggest-wearable-tech-buyers>.
- Janssen, M., Scheerder, J., Thibaut, E., Brombacher A. and Vos, S. (2017), “Who uses running apps and sports watches? Determinants and consumer profiles of event runners’ usage of running-related smartphone applications and sports watches”, *PLoS ONE*, Vol. 12, No.7, pp.0181167.
- Jones, G.R. (1986), “Socialization tactics, self-efficacy, and newcomers’ adjustments to organizations”, *Academy of Management Journal*, Vol. 29, pp. 262–279.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

- Junta de Andalucía (2020), *Por un millón de pasos*, Available at <https://www.juntadeandalucia.es/organismos/saludyfamilias/areas/salud-vida/programas-salud/paginas/porunmillondepasos.html>.
- Kautonen, T., Luoto, S. and Tornikoski, E.T. (2011a), “Influence of work history on entrepreneurial intentions in “prime age” and “third age”: A preliminary study”, *International Small Business Journal*, Vol. 28, No .6, pp. 583–601.
- Keegan, R.J., Harwood, C.G., Spray, C.M. and Lavallee, D. (2014), “A qualitative investigation of the motivational climate in elite sport,” *Psychology of Sport and Exercise*, Vol. 15, pp. 97–107.
- Kim, T. and Chiu, W. (2019), “Consumer acceptance of sports wearable technology: the role of technology readiness”, *International Journal of Sports Marketing and Sponsorship*, Vol. 20, No. 1, pp. 109-126.
- Kolt, G.S., Driver, R.P. and Giles, L.C. (2004), “Why older Australians participate in exercise and sport”, *Journal of Aging and Physical Activity*, Vol. 11, pp. 185–198.
- Kumar, H., Manoli, A.E., Hodgkinson, I.R. and Downward, P. (2018), “Sport participation: From policy, through facilities, to users’ health, well-being, and social capital”, *Sport Management Review*, Vol. 12, No. 5, pp. 549-562.
- Lamb, K.L., Asturias, L.P., Roberts, K., Brodie, D.A. (1992), “Sports participation: How much does it cost?”, *Leisure Studies*, Vol. 11, No. 1, pp. 19–29.
- Lee, H.E. and Cho, J. (2017), “What motivates users to continue using diet and fitness apps? Application of the uses and gratifications approach”; *Health Communication*, Vol. 32, No. 12, pp. 1445-1453.
- Lévesque, M. and Minniti, M. (2006), “The effect of aging on entrepreneurial behavior”, *Journal of Business Venturing*, Vol. 21, No. 2, pp. 177–194.
- Li, N. and Kirkup, G. (2007), “Gender and cultural differences in internet use: a study of China and the UK”, *Computers & Education*, Vol. 48 No. 2, pp. 301-317.
- Li, C.H. and Chang, C.M. (2016), “The influence of trust and perceived playfulness on the relationship commitment of hospitality online social network-moderating effects of gender”, *International Journal of Contemporary Hospitality Management*, Vol. 28, No. 5, pp. 924–944.
- Lieberoth, A. (2015), “Shallow gamification: Testing psychological effects of framing an activity as a game”, *Games and Culture*, Vol. 10, No. 3, pp. 229–248.
- Litalien, D., Morin, A.J. and McInerney, D.M. (2017), “Achievement goal profile among adolescent males and females”, *Developmental Psychology*. Vol. 53, pp. 731–751.
- Litman, L., Rosen, Z., Spierer, D., Weinberger-Litman, S., Goldschein, A. and Robinson, J. (2015), “Mobile exercise apps and increased leisure time exercise

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

- activity: A moderated mediation analysis of the role of self-efficacy and barriers”, *Journal of Medical Internet research*, Vol. 17, No .8, pp. e195.
- Liu, C.T., Guo, Y.M. and Lee, C.H. (2011), “The effects of relationship quality and switching barriers on customer loyalty”, *International Journal of Information Management*, Vol. 31 ,pp. 71–79.
- Martocchio, J.J. and Webster, J. (1992), “Effects of feedback and cognitive playfulness on performance in microcomputer software training”, *Personnel Psychology*, Vol. 45, No. 3, pp. 553–578.
- McGonigal, J. (2011), *Reality is broken: Why games make us better and how they can change the world*, New York: Vintage.
- Merhi, M.I. (2016), “Towards a framework for online game adoption”, *Computers in Human Behaviour*, Vol. 60, pp. 253–263.
- Miralles, F., Giones, F. and Gozun, B. (2017), “Does direct experience matter? Examining the consequences of current entrepreneurial behavior on entrepreneurial intention”, *International Entrepreneurship Management Journal*, Vol. 13, pp. 881–903.
- Mok, C. and Iverson, T.J. (2000), Expenditure-based segmentation: Taiwanese tourists to Guam”, *Tourism Management*, Vol. 21, pp. 299–305.
- Molanorouzi, K., Khoo, S. and Morris, T. (2015), “Motives for adult participation in physical activity: type of activity, age, and gender Keyvan”, *BMC Public Health*, Vol. 15, pp. 66-78.
- Morris, T., Clayton, H., Power, H. and Han, J. (1995), “Activity type differences in participation motives”, *Australian Journal of Psychology*, Vol. 47, pp. 101–102.
- Müller-Stewens, J., Schlager, T., Häubl, G. and Herrmann, A. (2017), “Gamified information presentation and consumer adoption of product innovations”, *Journal of Marketing*, Vol. 81, No. 2, pp. 8-24.
- Pavlas, D., Heyne, K., Bedwell, W., Lazzara, E. and Salas, E. (2010), *Game-based learning: The impact of flow state and videogame self-efficacy*, In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*. Los Angeles, CA: SAGE Publications, Vol. 54, No. 28, pp. 2398–2402.
- Penedo, F.J. and Dahn, J.R. (2005), “Exercise and well-being: A review of mental and physical health benefits associated with physical activity”, *Current Opinion in Psychiatry*, Vol. 18, No. 2, pp. 189–193.
- Renner, B., Spivak, Y., Kwon, S. and Schwartz, R. (2007), “Does age make a difference? Predicting physical activity of South Koreans,” *Psychology and Aging*, Vol. 22, pp. 482–493.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

- Richter, G., Raban, D.R. and Rafaeli, S. (2015), *Studying gamification: The effect of rewards and incentives on motivation*, In *Gamification in Education and Business*. Springer, Cham, pp. 21–46.
- Robbins, L.B., Pis, M.B., Pender, N.J. and Kazanis, A.S. (2004), “Exercise self-efficacy, enjoyment, and feeling states among adolescents”, *Western Journal of Nursing Research*, Vol. 26, No. 7, pp. 699–715.
- Rowe, K., Shilbury, D., Ferkins, L. and Hinckson, E. (2013), “Sport development and physical activity promotion: An integrated model to enhance collaboration and understanding”, *Sport Management Review*, Vol. 16, No. 3, pp. 364–377.
- Ryan, R.M. and Deci, E.L. (2000), “Intrinsic and extrinsic motivations: Classic definitions and new directions”, *Contemporary Educational Psychology*, Vol. 25, pp. 54–67.
- Sallis, J.F. and Owen, N. (1998), *Physical activity and behavioral medicine*, In: Sallis, J. and Owen, N. (eds), *Behavioral Medicine and Health Psychology*. Thousand Oaks, CA: Sage Publications, pp. 3.
- Scheiner, C.W. and Witt, M. (2013), “The backbone of gamification: A theoretical consideration of play and game mechanics”, *GI-Jahrestagung*, pp. 2372–2386.
- Schell, J. (2008), *The Art of Game Design, A book of lenses*, Burlington, Mass: Morgan Kaufmann Publishers (Elsevier).
- Schwarzer, R., Bäßler, J., Kwiatek, P., Schröder, K. and Zhang, J.X. (1997), “The assessment of optimistic self-beliefs: comparison of the German, Spanish, and Chinese versions of the general self-efficacy scale”, *Applied Psychology*, Vol. 46, No. 1, pp. 69–88.
- Seaborn, K. and Fels, D.I. (2015), “Gamification in theory and action: A survey”, *International Journal of Human–Computer Studies*, Vol. 74, pp. 14–31.
- Song, J., Kimb, J. and Cho, K. (2018), “Understanding users’ continuance intentions to use smart-connected sports products”, *Sport Management Review*, Vol. 21, pp. 477–490.
- Spanish Ministry of Education, Culture and Sport (2018), Anuario de estadísticas deportivas 2017, available at http://www.culturaydeporte.gob.es/servicios-al-ciudadano-mecd/dms/mecd/servicios-al-ciudadano-mecd/estadisticas/deporte/anuario-deporte/AED-2018/Anuario_de_Estadisticas_Deportivas_2018.pdf
- Standage, M., Gillison, F.B., Ntoumanis, N. and Treasure, D.C. (2012), “Predicting Students’ physical activity and health-related well-being: a prospective cross-domain investigation of motivation across school physical education and exercise settings,” *Journal of Sport and Exercise Psychology*, Vol. 34, No. 1, pp. 37–60.
- Stephan, Y., Boiché, J. and Le Scanff, C. (2010), “Motivation and physical activity behaviors among older women: a self-determination perspective,” *Psychology of Women Quarterly*, Vol. 34, pp. 339–348.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

- Tu, R., Hsieh, P. and Feng, W. (2019), “Walking for fun or for “likes”? The impacts of different gamification orientations of fitness apps on consumers’ physical activities”, *Sport Management Review*, Vol. 22, pp. 682-6937.
- Vargo, S.L. and Lusch, R.F. (2004), “Evolving to a new dominant logic for marketing”, *Journal of Marketing*, Vol. 68, No. 1, pp. 1–17.
- Vos, S., Janssen, M., Brombacher, A. and Scheerder, J. (2014), *Running events: Drivers for sensible and sustainable running? A study on event runners types in relation to health related services research context methodology*, In: EASS Conference. Utrecht, pp. 49.
- Warner, S. (2019), “Sport as medicine: How F3 is building healthier men and communities”, *Sport Management Review*, Vol. 22, No. 1, pp.38–52.
- Whittingham, K.L. (2017), “Gender differences in relationships between personality and career attribute priority”, *Journal of Business Diversity*, Vol. 17, No. 2, pp. 30–40.
- WHO, World Health Organization (2014), “Envejecer bien”, una prioridad mundial, Available at <http://www.who.int/mediacentre/news/releases/2014/lancet-ageing-series/es/>.
- Wilcox, S., Tudor-Locke, C.E. and Ainsworth, B.E. (2002), *Physical activity patterns, assessment, and motivation in older adults*. In Shepard. R.J. (Ed.), *Gender, physical activity, and aging* (pp. 13–39). Boca Raton, FL: CRC Press.
- Wood, R. and Bandura, A. (1989), “Social cognitive theory of organizational management”, *Academy of Management Review*, Vol. 14, No. 3, pp. 361–384.
- Wu, J. and Liu, D. (2007), “The effects of trust and enjoyment on intention to play online games”, *Journal of Electronic Commerce Research*, Vol. 8, No. 2, pp. 128–140.
- Yuan, K.H. and Hayashi, H.K. (2003), “Bootstrap approach to inference and power analysis based on three statistics for covariance structure models”, *British Journal of Mathematical and Statistical Psychology*, Vol. 5, No. 1, pp. 161–175.
- Zhang, K.Z.K., Lee, M.K.O., Cheung, C.M.K. and Chen, H. (2009), “Understanding the role of gender in bloggers’ switching behavior”, *Decision Support Systems*, Vol. 47, pp. 540–546.
- Zurita-Ortega, F, Castro-Sánchez, M., Chacón-Cuberos, R., Cachón-Zagalaz, J., Cofré-Bolados, C., Knox, E. and Muros, J.J. (2018), “Analysis of the Psychometric Properties of Perceived Motivational Climate in Sport Questionnaire and Its Relationship to Physical Activity and Gender Using Structural Equation Modelling”, *Sustainability*, Vol. 10, pp. 632-645.

Capítulo V: Influence of gamification on perceived self-efficacy: gender and age moderator effect

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived value

Artículo 2

Autor/es	Ana Isabel Polo-Peña, María Lina Fernández-Ruano y Dolores María Frías-Jamilena
Título	Gamified environmental interpretation as a strategy for improving destination perceived value
Revista	Tourism & Management Studies
Fecha	No publicado, en revisión
Volumen, número	No publicado, en revisión
Páginas	No publicado, en revisión
DOI	No publicado, en revisión
Índices de Impacto	Datos del Journal Citation Reports último año publicado (2021) <ul style="list-style-type: none">• Factor de impacto: 0.32• Cuartil: Q3• Categoría: HOSPITALITY, LEISURE, SPORT & TOURISM – SSCI Posición 93 de 132 en el área de HOSPITALITY, LEISURE, SPORT & TOURISM – SSCI
Indexación en bases de datos	Revista indexada en: <ul style="list-style-type: none">• Emerging Sources Citation Index• Scopus• DOAJ• Hospitality & Tourism Complete• Hospitality & Tourism Index• DIALNET

1. Introduction

Tourist destinations are under increasing pressure to develop strategies for building competitiveness in the market (Frías-Jamilena, Polo-Peña & Rodríguez-Molina, 2017). In this regard, perceived value is regarded to be a representative variable of tourist behavior (e.g., Baker & Fulford, 2016; Oviedo-García, Castellanos-Verdugo, Vega-Vázquez & Orgaz-Agüera, 2017) and is also a major indicator of the level of conservation of the destination's resources (Ahn & Kwon, 2020; Polo-Peña, Frías-Jamilena & Rodríguez-Molina, 2013). Researchers and sector professionals alike are keen to identify actions that can help alleviate the detrimental consequences of the tourist's interactions with their destination of choice (Yenidogan, Gurcaylilar-Yenidogan & Tetik, 2021; Oviedo-García et al., 2017) and that are reflected in enhanced destination perceived value.

Environmental interpretation (hereafter, EI) is known to be an effective tool for raising tourists' awareness of how to improve destination sustainability (Ballantyne, Hughes, Lee, Packer & Sneddon, 2018). When a tourist visits a destination, he or she is looking for an experience. Hence, *gamified* EI allows the tourist to get to know the destination from a sustainability point of view while enjoying an enhanced experience (Xu, Buhalis & Weber, 2017). Gamification can render a tourism service more enjoyable, more participatory, and more intrinsically motivating (Huotari & Hamari, 2017). At the same time, information and communications technologies (ICTs) offer significant potential in terms of gamifying such services and, thus, contributing to the sustainability of destinations (Fennell, 2021).

The specialist gamification literature underlines the fact that there is no single method or design for gamification that works well across the board, in all spheres of application (Seaborn & Fels, 2015). According to the guidelines established in the literature on the effective design of EI experiences (e.g., Coghlan & Carter, 2020) and gamification (e.g., Hamari, 2017), it is essential to pay attention not only to isolated game elements but also to the experience generated in the participant, which must be motivating and enjoyable *and* capable of influencing their behavior. There is continued interest in the literature regarding the use and impact of this more holistic approach to gamification design when creating an EI program for tourist destinations.

The primary aim of the present study is therefore to establish whether applying gamification to an EI program (using ICTs) constitutes a valid strategy for supporting destinations' efforts to foster tourists' knowledge of sustainability issues and thus help enhance destination perceived value. The goals of the study are: 1) to propose a holistic design approach to the gamification of an EI program, based on the literature review; 2) to test whether a motivating and enjoyable experience is generated for the participating tourists that is capable of positively enhancing their behavior; and 3) to demonstrate whether participation in a holistically-designed gamified EI program influences destination perceived value.

2. Literature review

2.1. Implementing a gamified EI program to strategically build competitiveness

Tourism has links with virtually every other economic sector and has profound and far-reaching impacts on all dimensions of sustainable development (Costa & Lima, 2018; Hall, 2019). However, as noted by Thiel-Ellul and Navarro-Jurado (2014, p.1), “it is not the development of tourist activity that offers a guarantee of the sustainability of destinations; rather, it is the sustainability of the territory that is the key element for their long-term development”.

Among the tools that can help support the improvement of destination sustainability—and, consequently, destination competitiveness—is EI. Continued advances in ICTs are enabling interpretative tools to evolve, particularly in terms of further enhancing the participant experience (Hofman, Hughes & Walters, 2021). Gamification can be considered a strategy with the capacity to raise sustainability while, at the same time, enhancing the tourist experience (Xu et al., 2017).

That said, the results delivered by this strategy largely depend on the quality of the gamification design (Torres, Augusto & Neves, 2022). The specialized literature on gamification indicates that the mere inclusion of isolated game elements in an EI program is not enough to achieve a positive effect on the participant’s behavior (Morschheuser, Werder, Hamari & Abe, 2017). Rather, it has been found necessary to adopt a holistic gamification design that aligns with the scope of application and the specific objectives to be achieved via the gamification. It is also essential to analyze whether the participant feels their *experience* of the gamification was motivating and enjoyable.

Based on all of these factors, it is of interest to advance toward a better understanding of whether taking part in a *gamified* interpretation experience influences tourist perceived value of that destination. This tourist perspective can provide greater knowledge of 1) the holistic gamification approach implemented through ICTs, 2) the measurement of the participant’s experience of such a holistic gamification approach, and 3) the impact of participation on tourist behavior (through the ‘destination perceived value’ variable).

2.2. Gamifying an EI program for tourists: Its effect on destination perceived value

Perceived value is defined as “the consumer’s overall assessment of the utility of a product based on perceptions of what is received and what is given” (Zeithaml, 1988, p. 14). It has been found that perceived value may help increase destination competitiveness (Zhang, Adhikari, Fahmy & Kang, 2020), including via the conservation of destination resources, which visitors notice and appreciate (Ahn & Kwon, 2020; Polo-Peña et al., 2013; Oviedo-García et al., 2017).

Perceived value can be considered a multidimensional construct, with different authors highlighting different dimensions (Polo-Peña, Frías-Jamilena & Rodríguez-

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

Molina, 2012). Most scholars agree that two broad aspects of perceived value can be distinguished: utilitarian factors, such as quality, monetary value, and convenience; and hedonic factors or, in a broader classification, affective factors, which also embrace social factors (Polo-Peña et al., 2012).

Gamification can contribute to improving the perception of both utilitarian and affective factors (Hamari & Koivisto, 2015a; Torres et al., 2022). In the tourism context, gamification offers a range of benefits for tourists, including both the sheer hedonic fun and enjoyment of simply participating, coupled with the utilitarian value of the game itself, given that the purpose of gamification is to enhance the basic or core service that is offered to everyone (Xu et al., 2017). Studies on online gamification (Hsu, Chen, Yang & Lin, 2017; Hsu & Chen, 2018) have shown that the experience of using an online interface that includes certain game elements positively influences the dimensions of perceived value.

However, based on the contributions of these two studies in the online field, there is evidence of a gap in the scholarship—specifically, regarding the impact of participation in a gamified experience in terms of destination perceived value. It is of interest to determine whether, among those tourist destinations that use gamification, this approach constitutes a valid strategy for achieving greater destination perceived value while promoting awareness of sustainability among visitors. This understanding may contribute to maximizing the competitiveness and sustainability of the destination. If gamification is, indeed, found to generate greater destination perceived value, this may be because its use is associated with the improvement of a core service (which can generate the perception of a greater *functional* value), grounded in an intrinsically motivating and enjoyable experience (which can generate the perception of a higher *affective* value). Therefore, it may be that participating in a gamified EI program that is geared to enabling visitors to get to know the destination from a sustainability point of view will contribute to generating greater perceived value. On this premise, it is proposed that:

Hypothesis 1. Participation in a gamified EI program exerts a significant, positive effect on destination perceived value.

2.3. Gamification: Holistic design and the *gameful* experience

Gamification dates back to 2008, but it was not until 2011 that the first academic research was published on the topic. Researchers at that time were interested in discerning the factors that make games so enjoyable and motivating (Deterding, 2015).

The early studies dealing with the use of gamification exclusively adopted a *systemic* perspective on games. This corresponds with the widely-accepted definition of gamification proposed by Deterding, Dixon, Khaled & Nacke (2011, p. 9): “Gamification is the use of game design elements in nongame contexts”. Later, this understanding was criticized by some scholars for its incompleteness, given that it

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

fails to capture how participants actually perceive the gamified experience (Huotari & Hamari, 2017).

It was thus proposed by some authors that the experiential aspects of games should be brought to the fore in scholarly analysis. From this broader perspective, gamification was defined by Huotari and Hamari (2017, p. 25) as: “a process of enhancing a service with *affordances* for *gameful* experiences in order to support users’ overall value creation”. As noted earlier, *affordance* denotes the motivational features incorporated into the game that promote the specific desired behaviors among participants. The other key term in this definition is *gameful*. An experience is considered *gameful* when it is enjoyable and, again, intrinsically motivating—essential features when it comes to both designing gamification and experiencing it as a user (Hamari, Koivisto & Sarsa, 2014).

Thus, if the desired effects are to be achieved using gamification, it is essential that the participant enjoys a *gameful* experience; and, for this, it is necessary to approach the design of the gamification holistically (that is, to achieve a design that combines the right game elements that will optimize the *experiential* dimension for participants). However, previous research examining this approach is scarce (Huotari & Hamari, 2017), and its effects on variables of consumer behavior have not been proven, to date.

Therefore, to demonstrate how participating in a gamified experience impacts on consumer behavior, 1) that experience has to be designed holistically, and 2) the participant’s experience must be measured, to determine whether that experience was, indeed, *gameful* for them.

2.3.1. Creating a gamified EI program for tourists based on a holistic design approach

In previous studies, many gamification experiences have been proposed that simply involve the inclusion of disparate game elements (badges or points, for instance) in order to achieve a specific result. This overly-simplified design approach, sometimes referred-to as “pointification” (Seaborn & Fels, 2015), has met with criticism from some authors (Hamari, 2017; Seaborn & Fels, 2015).

In response to these criticisms, various methods have been employed in the scholarship that are based on a *holistic* gamification design. Such methods include the “MDA” model (referring to “mechanics, dynamics, and aesthetics”) developed by Hunicke, LeBlanc & Zubek (2004). In holistic gamification design, a systematic process is followed to identify, evaluate, and visualize the different aspects, including the context, the participants, the objectives, the design of the interface via which the participant is going to participate in the gamification, and the evaluation of the participant’s experience (based on their view of what it was like to participate in the gamification) (Aparicio, Vela, Sánchez & Montes, 2012; Deterding, 2015; Morschheuser et al., 2017).

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

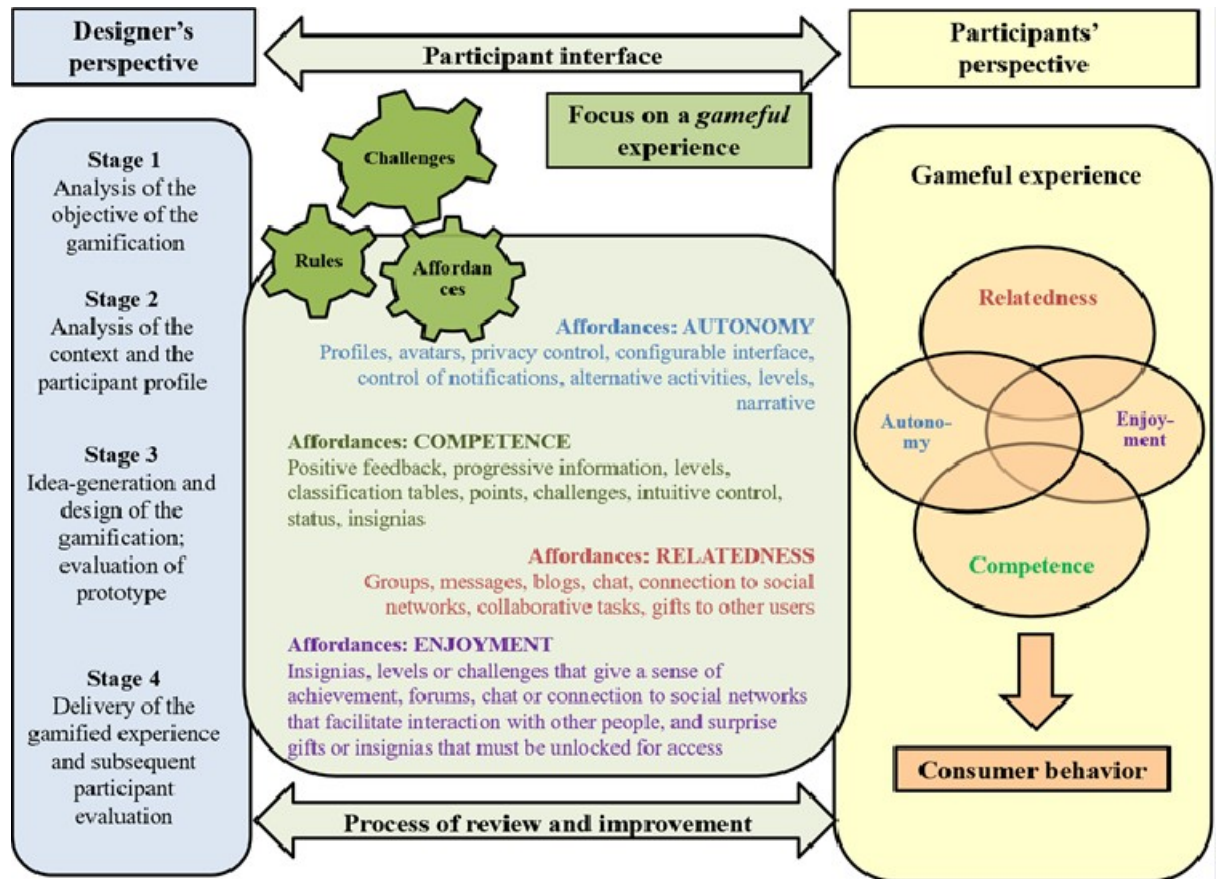
Based on the recommendations of different authors, then, it is proposed that the design of the gamified program be approached following a systematic procedure comprising four stages (Figure 1):

- **Stage 1: Analysis of the objective being pursued.** Stage 1 should begin with an analysis of the objective that is being pursued (in this case, by the EI program) to ensure that this lends itself to the possibilities offered by gamification (Aparicio et al., 2012) and to check that gamification is an appropriate solution for the underlying problem or need to begin with (Morschheuser et al., 2017).
- **Stage 2: Analysis of the context and the participant profile.** In this stage, questions such as where the gamification is to be used must first be identified and understood, and the target group defined and characterized. This analysis also involves the identification of participants' needs and motivations within the game, and the actions and decisions they must take while in the system (Morschheuser et al., 2017). If the design of the gamification is not based on a sound understanding of the participants and the context of use (Morschheuser et al., 2017), it cannot be effective.
- **Stage 3: Design of the interface through which the participant will interact with the gamified program.** The creative design of the interface starts out from a list of design ideas (Morschheuser et al., 2017). Best-practice examples and reoccurring elements in gamification approaches were used as starting points for this idea-generation phase (Aparicio et al., 2012; Burgers, Eden, Van Engelenburg & Buningh, 2015; Xu et al., 2017). Taking into account the objective to be achieved by the participants (rather than the objective sought by the designer), the tasks they have to perform and the rules they have to follow need to be established. It is important that the objective set for the participants through gamification is engaging and significant enough for them to feel a genuine interest in achieving it and experience immersion in the game (Aparicio et al., 2012). Thus, every effort should be made, through the design, to ensure that participants reflect on the significant aspects of the overall objective, to become aware of its importance (Zuckerman & Gal-Oz, 2014). The optimal combination of *affordances* is then sought that will provide a *gameful* experience that gives participants control and enables them to exercise their own will throughout the game (Burgers et al., 2015). The design of such *affordances* provides challenges and also tests expertise (Xu et al., 2017), which enables participants to interact and connect with others (Xu et al., 2017), solve problems, overcome adversity, discover something new, be amazed or surprised, and so on (Robson, Plangger, Kietzmann, McCarthy & Pitt, 2015).
- **Stage 4: Implementation and evaluation of gamification.** Many authors agree on the importance of evaluating gamification to test whether it has been successful (Aparicio et al., 2012; Morschheuser et al., 2017). The success of a gamification design can be established by verifying that it

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

generated a *gameful* experience for participants. This is a fundamental step in determining whether participation in a gamified experience can positively influence variables of consumer behavior (Huotari & Hamari, 2017).

Figure 1. Framework diagram proposed to design an EI program base on a holistic gamified approach



2.3.2. The gameful experience from a gamified EI program

When the participant experiences the gamification as enjoyable and intrinsically motivating, it can be deemed a *gameful* experience. However, the majority of authors overlook the *gameful* experience as a necessary consequence of participation in gamification that has been designed holistically (Huotari & Hamari, 2017; Koivisto & Hamari, 2019). Specifically, in the tourism field, except for the study by Liu, Wang, Huang & Tang (2019), which was conducted in the context of festivals, and that of Lee (2019), which examines monumental heritage, the previous literature deals solely with the elements that render certain gamification features easier to adopt and use, and how they shape the behavior of participants. It does not analyze the individual's experience of taking part in such a program (specifically, to what extent they considered it *gameful*). Furthermore, there is no scholarly consensus regarding the dimensions that form a *gameful* experience, nor on how to measure it (Deterding et al., 2011; Eppmann, Bekk & Klein, 2018; Huotari & Hamari, 2017). In view of this gap in the literature, there is a need for greater knowledge about the *gameful* experience

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

1) as a result of participating in a gamified program with a holistic design and 2) vis-à-vis the content and dimensions that determine that experience.

Regarding the dimensions of the *gameful* experience, the contributions of Eppmann et al. (2018) and Liu et al. (2019) are helpful. In the scales they develop, the two studies concur in highlighting the importance of participants' enjoyment via a specific dimension. And Liu et al. (2019) underline the importance of encouraging the intrinsic motivation of the participants in a gamification experience.

The most relevant conceptual framework in gamification research is Self-determination Theory (Seaborn & Fels, 2015). This theory is grounded on the premise that intrinsic motivation derives from three fundamental psychological needs: *autonomy*, understood as the sense of having the freedom to decide *whether* to carry out a certain action, and having a choice about *how* to go about it (Burgers et al., 2015); *competence*, referring to the individual's feeling of having the ability to carry out that action and successfully fulfill the purpose to which it is linked (Xu et al., 2017); and *relatedness*, referring to the human need to feel connected to other people and recognized and accepted by them (Koivisto & Hamari, 2019). A person's intrinsic motivation is enhanced when these three psychological needs are met (Deci & Ryan, 1985).

'Enjoyment' is defined as a specific emotional state in which the individual derives pleasure and even happiness from an experience (Merhi, 2016), independent of any particular outcome they might achieve from taking part in it (Holbrook, 1994). This emotional state is deemed to be a core feature of participation in games (Ha, Yoon & Choi, 2007). Specifically, from the point of view of gamification, enjoyment is understood as interaction with the elements of the gamification design (Hamari & Koivisto, 2015a) that arises spontaneously among participants as they explore the game's features and respond creatively to them (Hamari & Koivisto 2015a). Their enjoyment also motivates participants to show greater perseverance when it comes to adopting the behaviors the gamification experience is designed to promote over the longer term (Deci & Ryan, 1985; Wu & Liu, 2007). Enjoyment has been found to influence consumer behavior, such as individuals' response to product innovations (Aroean, 2012) or new products or experiences (Hoffman & Novak, 1996).

According to the literature and as shown in Figure 1, the satisfaction of basic needs linked to intrinsic motivation and a sense of enjoyment can be achieved through a gamified experience enhanced by specific motivational elements (*affordances*). It is for this reason that gamification experiences should be designed holistically, as this contributes to creating a system that is capable of influencing the participant's behavior by creating a *gameful* experience for them. It is therefore hypothesized that:

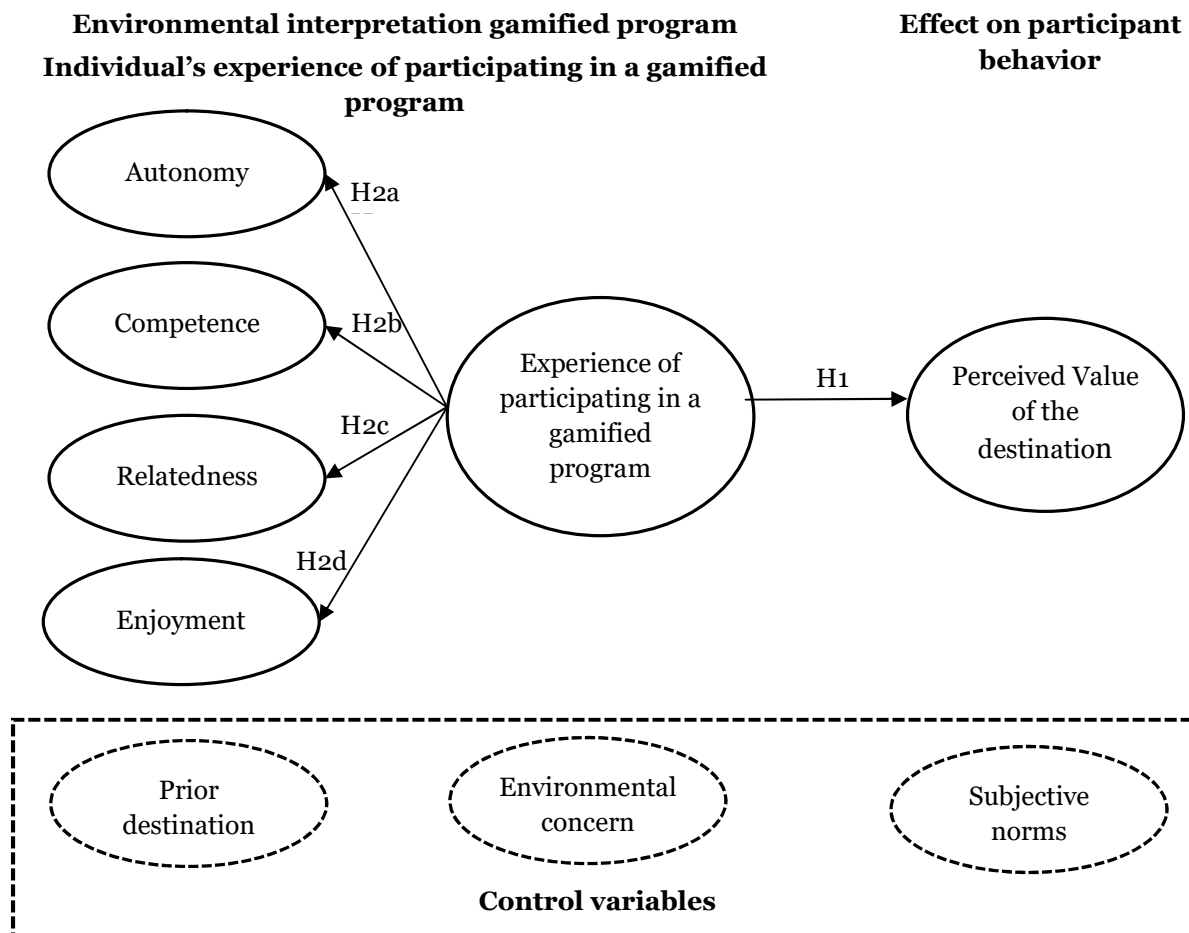
Hypothesis 2. (a) Autonomy, (b) competence, (c) relatedness, and (d) enjoyment are dimensions of the *gameful* experience derived from a gamified EI program.

In short, gamification can be understood as a process that embraces both the designer's and the participant's perspectives to create a holistic design that delivers

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

positive psychological outcomes, including a *gameful* experience (as shown in the research model represented in Figure 2). Gamification has been found to produce effective results in terms of influencing consumer behavior, as reflected, for example, in an increase in perceived value.

Figure 2. Proposed research model



3. Methodology

3.1. Study sample and procedure

Spain was chosen as the site of the empirical study because it is a leading tourist destination on an international scale (UNWTO, 2020). As such, it faces a number of challenges in terms of achieving long-term destination sustainability and calls to take action toward this essential goal (Ministerio de Industria, Comercio y Turismo, 2019).

Our sample comprised British and American adults (aged 18+) who were potential tourists for Spain, with both cohorts known to be important to the country's tourism industry (INE, 2020). As none of the subjects had ever visited Spain before, this ensured we avoided the possible effect of previous destination experience on the dependent variable. Our approach to building the sample was in line with the

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

procedures followed in other studies performed on an English-speaking public (Pike, Pontes & Kotsi, 2021). For example, we employed an international Internet user panel provided by an external company (in this case, Dynata) to ensure we achieved representativeness in our study sample.

Those potential subjects who confirmed their agreement to take part in the research were given access to a secure intranet containing the survey questions and the gamified EI program in which they had been invited to participate. They were then asked to undertake the following steps: 1) to respond to a questionnaire structured around the three primary scales in our study (their preexisting image of Spain, their personal level of concern for the environment, and subjective norms); 2) to participate in the gamified EI program under controlled time conditions to ensure a minimum length of exposure prior to moving on to the final step; and 3), to answer a second set of questions, this time relating to the scales for *gameful* experience, 'perceived value' (which was the dependent variable), and their sociodemographic profile (based on the variables of age, gender, and employment status)

While the size of our sample was relatively small, it was sufficient to ensure a sound statistical analysis because all the subjects participated fully in the entire EI program (Hair, Black, Babin & Anderson, 2009). The final sample comprised 158 subjects who had all returned valid questionnaires. The demographic profile of the sample largely coincided with that of the study population (British and American potential tourists) (IndexMundi, 2019; Koema, 2018) (see Table 1)

Table 1. Demographic profile of the final study sample

Variable	Value (percentage)
Gender	41% Male 59% Female
Age	17% between 18 and 29 years old 24% between 30 and 44 years old 38% between 45 and 65 years old 21% over 65 years old
Employment status	57% in employment 43% not in employment

3.2. Participation in gamification

A gamified experience was designed holistically, following the staged process outlined in Figure 3. In **stage 1**, the objective of the proposed program was analyzed to assess whether gamification was compatible with achieving the desired results. In **stage 2**, the context of application and the profile of the participants were analyzed. This resulted in an overall design concept for the gamification, featuring content about the destination that centered on sustainability. For the design concept, our approach

drew on the recommendations of Wolf, Stricker & Hagenloh (2013) and was based on multimedia files that blended written text, images, and sound.

Figure 3. Structure of the gamified EI program



The content primarily focused on information about the destination's resources and the environmental sustainability guidelines established by White, McCrum, Blackstock & Scott (2006). Practical information was included on how to act correctly in each place (following the recommendations of Ballantyne, Packer & Hughes., 2009).

Stage 3 was concerned with designing the interface via which the subject was to interact with the gamified program (Figure 3 and Appendix 1). Here, it was important to respond to the objectives set for the participants and to identify the right combination of *affordances* to incorporate, as well as the rules of the game and the goals set for the gamified experience. On this basis, the process to be followed by the participant was designed (as per Figure 3), bringing together a combination of *affordances* aimed at promoting intrinsic motivation and enjoyment, in light of previous recommendations made by other authors (Table 2).

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

Table 2. Affordances designed into the gamification

<i>Affordances and design elements used in the gamification</i>	Heightens intrinsic motivation:	Increases participants' fun:
Interesting and challenging narrative	x	x
Personalizable avatar	x	
Profile with record of personal details and performance	x	
Clear instructions on the challenges, tasks, and levels to be fulfilled	x	
Points, insignias, rewards, and surprise elements	x	x
Classification tables	x	x
Option to share on social networks	x	x

Source: Based on the works of Aparicio et al. (2012), Burgers et al. (2015), Hamari et al. (2014), Lounis, Pramataris & Theotokis (2014), Robson et al. (2015), and Xu, Cui, Ballantyne & Packer (2013).

Finally, with the game interface fully designed, **stage 4** involves the delivery of the gamified experience and its participant evaluation, based on the scale validation for *gameful* experience and the measurement of its effect on perceived value.

3.3. Measurement scales

Gameful experience was measured on a scale that we first validated, which covered intrinsic motivation and enjoyment. The scale developed by Lieberoth (2015) was used to measure intrinsic motivation, while that developed by Van der Heijden (2004) was used to measure enjoyment. The latter was also previously applied by Hamari and Koivisto (2015a). Destination perceived value was measured on a scale based on Frías-Jamilena et al. (2017) (see Appendix 2).

To check for any variables that may have influenced the proposed effect of participating in a gamified EI program on perceived value, three control variables were applied: 'preexisting image of Spain as a tourist destination', 'environmental concern', and 'subjective norms' (Malhotra, 2010). All three were measured before the subjects were exposed to the gamified EI program (Kirk, 2012). Following the approach of earlier studies (Beerli & Martín, 2004; Frías, Rodríguez & Castañeda, 2008), we used a semantic differential scale to measure preexisting destination image. Turning to the variable 'environmental concern', this was measured on a scale

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

previously used by Chang, Zhang and Xie (2015) and Kim and Choi (2005). And, once again, the work of Hamari and Koivisto (2015b) was used as a benchmark for selecting the 'subjective norms' measurement scale (see Appendix 2). Finally, three variables (gender, age, and employment status) were captured to create the sociodemographic profile of the sample (as per Table 1).

3.4. Data Analysis

It can be seen from Figure 2 that 'Experience of participating in a gamified EI program' comprises the first-order dimensions 'Autonomy', 'Competence', 'Relatedness', and 'Enjoyment'. 'Perceived value' (the dependent variable) and 'Preexisting destination image', 'Environmental concern', and 'Subjective norms' (control variables) are all first-order constructs.

The method selected to test the research hypotheses was structural equation modeling (SEM), using AMOS v.21 software to validate the measurement scales and test the relationships between variables.

Starting with the estimated model's psychometric properties, we found that the Chi-square test of multivariate normality was significant. Therefore, we opted to estimate the model with the maximum likelihood method coupled with bootstrapping (Yuan & Hayashi, 2003). The results relating to overall model fit (normed Chi-square, 2.16; RMSEA, 0.08) were acceptable relative to the recommended threshold. The indicators for incremental fit also presented acceptable values: CFI (0.92), IFI (0.92), and TLI (0.91). Overall, the model fit can thus be deemed acceptable.

4. Results

First, to verify that a variable adequately reflects the composition of a scale, it is necessary to confirm that the scale in question presents an appropriate level of validity and reliability (Devlin, Dong & Brown, 1993). On this basis, we estimated the composite reliability and variance extracted of each of the dimensions on the first-order scale, in order to determine their internal consistency. The values obtained for both composite reliability and variance extracted were close to, or above, the reference values (0.70 and 0.50, respectively—see Table 3). There was one exception, namely 'Experience of participating in a gamified EI program' (second-order dimension), whose variance extracted value was very close to the reference threshold of 0.50. These results indicated that the validity and reliability of the measurement scales for the variables 'Experience of participating in a gamified EI program' (with its dimensions of autonomy, competence, relatedness, enjoyment, and perceived value) were valid.

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

Table 3. Variables / dimensions and their composite reliability and variance extracted

Variables	Dimensions	Composite reliability	Variance extracted
Experience of participating in the gamified program*		0.76	0.46
	Autonomy	0.93	0.81
	Competence	0.95	0.078
	Relatedness	0.93	0.82
	Enjoyment	0.95	0.83
Perceived value		0.96	0.81
Prior destination image		0.96	0.81
Environmental concern		0.93	0.74
Subjective norms		0.93	0.78
*Second-order dimensión			

Next, to test for discriminant validity, we conducted a confidence interval test. The result showed that there was, indeed, discriminant validity, as the value ‘1’ was not present in the confidence interval of the correlations between the different first-order dimensions (Anderson & Gerbing, 1988).

The aforementioned results validated that ‘Experience of participating in a gamified EI program’ can be captured as a second-order construct containing the dimensions ‘Autonomy’, ‘Competence’, ‘Relatedness’, and ‘Enjoyment’. Hypothesis 2 therefore receives empirical support.

Second, the results of the proposed research model were examined. It is important to take into consideration the effect of the control variables in the research model—preexisting destination image, environmental concern, and subjective norms—on participants’ experience of the gamified program and how they perceive the destination’s value. It was found that the three variables significantly influence the ‘experience of participating’ variable (*preexisting destination image*: standardized coefficient 0.24, confidence interval 0.04–0.44, and p-value 0.05; *environmental concern*: standardized coefficient 0.34, confidence interval 0.16–0.52, and p-value 0.003; and *subjective norms*: standardized coefficient 0.35, confidence interval 0.18–0.53, and p-value 0.002). However, they have no such effect on perceived value (*preexisting destination image*: standardized coefficient 0.12, confidence interval -

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

0.02–0.29, p-value 0.18; *environmental concern*: standardized coefficient 0.01, confidence interval -0.14–0.18, and p-value 0.88; and *subjective norms*: standardized coefficient -0.25, confidence interval: -0.19–0.13, and p-value 0.73). These results show the importance of having considered the proposed control variables, as they enabled the bias in the research model to be corrected. On the basis of these results, we now turn to the results relating to Hypothesis 1.

Hypothesis 1 proposes that participation in the gamified experience has a positive effect on destination perceived value. The results suggest that this effect can be considered significant (0.55, with a confidence interval of 0.39–0.72). The p-value of these coefficients was >0.01 , which provides empirical support for Hypothesis 1 and indicates that participation in a gamified EI program does, indeed, contribute to an increase in tourist perceived value of the destination.

5. Discussion of the results, conclusions, and implications

Continually improving the competitiveness of tourist destinations has become a primary objective among tourism managers. This calls for the identification of strategies that help achieve greater destination perceived value, from the market's perspective. However, it is now essential to reorientate and prioritize the use of strategies compatible with the sustainability of the destination (Oviedo-García et al., 2017; Yenidogan, Gurcaylilar-Yenidogan & Tetik, 2021).

This study sought to determine the extent to which an EI program that can be gamified using ICTs, constitutes an effective strategy for contributing to destination competitiveness. We opted to study gamification as this approach has been linked by the literature to the creation of enriched tourist experiences (Xu et al., 2017).

Evaluating the effectiveness of the use of gamification implies building the knowledge-base regarding its design, the experience generated in the participant, and its effect on consumer behavior (e.g., Hamari, 2017; Seaborn & Fels, 2015).

With regard to gamification design, there is no single method that is valid for all fields of application (Robson et al., 2015; Seaborn & Fels, 2015). In this study, we identified that, to achieve a holistic design in the gamification of an EI program, the following stages must be followed: 1) analysis of the objective of the gamification; 2) analysis of the context and the participants; 3) design of the interface through which the participant is to participate in the gamification, which determines the tasks to be carried out and the rules to be followed while undertaking them. Here, it is of utmost importance to arrive at the optimal combination of: *affordances* (with a focus on the *gameful* experience, to give the participant control and enable them to exercise their own will during the game); challenge and expertise; and the possibility of interacting with other participants, among other aspects; and 4) the delivery of the gamified experience and its evaluation by the participants. It is essential to verify that a *gameful* experience has been generated for the participants, such that it is capable of influencing their behavior.

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

In relation to this last stage, to verify that participants have enjoyed a *gameful* experience, in the present study, potential tourists from a given destination were used and their participation in the gamified EI program (based on a holistic design) was controlled. The results showed that the *gamified* environmental program generated an experience that participants found intrinsically motivating. In other words, this gamified design successfully produced feelings of autonomy, competence, and relatedness among participants, as well as generating enjoyment for them. These results are relevant for the tourism context because enjoyment and motivation are known to be fundamental features of the touristic experience (see, e.g., Polo-Peña et al., 2012).

Finally, these findings are also relevant to the specialist scholarship dealing with perceived value. First, gamification of the EI program can generate a *gameful* experience among participants, which has been shown here to be an antecedent of destination perceived value. That is, the design format of the EI experience influences its outcomes (Ardoin, Wheaton, Bowers, Hunt & Durham, 2015). These results, then, are also pertinent to the specialist sustainability literature and respond to the identified need to identify strategies that can foster flourishing destinations based on sustainable tourism.

5.1. Practical implications, limitations, and future research directions

The results of the present study are of value to both public and private entities devoted to improving and advancing tourist destinations by providing enhanced tourist experiences while supporting destination sustainability. These results lead us to propose that destinations should offer gamified EI experiences online, and indicate that, as well as contributing to a superior participant experience, this approach prompts potential tourists to assign greater value to the destination. This dual outcome is critical for more mature destinations in their continued efforts to sustain tourist appeal in the medium–long term.

The effectiveness of EI programs is found to be greater when these encourage participant interaction (as has traditionally been achieved thanks to tour guides) (Ballantyne et al., 2009). With the arrival of ICT and online environments, however, the scope for such interaction is now enhanced (Hsu et al., 2017; Paco & Pérez, 2015), offering new possibilities for gamification-based strategies such as gamified EI programs. Using this approach enables potential tourists to explore destinations in an interactive, readily accessible, and personalized way.

Our analysis also provides interesting insights regarding key factors in designing gamified EI experiences. Design should not be reduced to the mere inclusion of disparate game-like elements, focusing solely on systemic features (Huotari & Hamari, 2017). Rather, the gamification design should be informed by the ultimate objective the experience needs to deliver and the specific context of application (in this case, to improve the tourist experience and encourage the sustainability of Spain as a tourist destination). On this basis, designers must identify the optimal

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

combination and use of elements and *affordances* that will generate a *gameful* experience for participants. It is also crucial to assess whether the gamification has, indeed, achieved the desired results among participants. In the specific case relevant to this study, this means evaluating whether tourists' participation in the gamified design led them to enjoy an intrinsically motivating experience (measured in terms of autonomy, competence, and relatedness).

Finally, our results demonstrate to destination managers that there are market-oriented strategies that can be adopted and aligned to the promotion of destination sustainability. Offering a gamified EI program in which potential tourists can participate generates an experience that can offer managers opportunities to keep tourists engaged via the destination's website or social media, enhance visit intention, and encourage visitors to help protect the destination. Thus, gamified EI programs could be integrated into marketing campaigns that, in addition to promoting the destination itself, also engage tourists in the process of protecting it and supporting its sustainability through appropriate behaviors in the region being targeted.

5.2. Limitations and future research directions

The present study presents a series of limitations that should be borne in mind when interpreting the results and that, in themselves, can help shape potential lines of research for the future. Starting with the empirical aspect of the study, a leading international destination with a mature profile was chosen, but it would be interesting to replicate the study in different geographical areas to test how gamified EI programs perform in these different contexts, in terms of their effectiveness.

Secondly, it would be interesting to analyze new factors that may affect the design of the gamified EI program and its impact on tourist behavior. Among such factors could be variables related to the international nature of tourism: cultural differences among consumers, for instance, or differences in psychological distance. It would also be valuable to progress toward a better understanding of the effect of participating in gamified EI programs on tourists, both during their stay and post-stay.

Third, the combination of the 'new normal' experienced by the tourism industry as a result of the COVID-19 pandemic and the need to continue making progress toward the United Nations Sustainable Development Goals points to particular lines of research that should be considered for the future. For instance, it would be valuable to determine whether the use of gamified EI programs is effective in terms of influencing the variables of consumer behavior that are most relevant to achieving sustainable tourism—such as improving perceived safety at the destination or the adoption of pro-environmental behaviors. It would also be of interest to identify whether there are certain consumer characteristics that may influence the impact of gamified EI programs, such as the level of information literacy self-efficacy among participants.

6. References

- Ahn, J., & Kwon, J. (2020). Green hotel brands in Malaysia: perceived value, cost, anticipated emotion, and revisit intention. *Current Issues in Tourism*, 23(12), 1559-1574.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin*, 103(3), 411-423.
- Aparicio, A. F., Vela, F. L. G., Sánchez, J. L. G., & Montes, J. L. I. (2012). Analysis and application of gamification. *Proceedings of the 13th International Conference on Interacción Persona-Ordenador* (pp. 1-2).
- Ardoin, N. M., Wheaton, M., Bowers, A. W., Hunt, C. A., & Durham, W. H. (2015). Nature-based tourism's impact on environmental knowledge, attitudes, and behavior: a review and analysis of the literature and potential future research. *Journal of Sustainable Tourism*, 23(6), 838-858.
- Aroean, L. (2012). Friend or foe: In enjoying playfulness, do innovative consumers tend to switch brand? *Journal of Consumer Behaviour*, 11(1), 67-80.
- Baker, D. M. A., & Fulford, M. (2016). Cruise passengers' perceived value and willingness to recommend. *Tourism & Management Studies*, 12(1), 74-85.
- Ballantyne, R., Hughes, K., Lee, J., Packer, J., & Sneddon, J. (2018). Visitors' values and environmental learning outcomes at wildlife attractions: Implications for interpretive practice. *Tourism Management*, 64, 190-201.
- Ballantyne, R., Packer, J., & Hughes, K. (2009). Tourists' support for conservation messages and sustainable management practices in wildlife tourism experiences. *Tourism Management*, 30(5), 658-664.
- Beerli, A., & Martín, J. D. (2004). Factors influencing destination image. *Annals of Tourism Research*, 31(3), 657-681.
- Burgers, C., Eden, A., Van Engelenburg, M. D., & Buningh, S. (2015). How feedback boosts motivation and play in a brain-training game. *Computers in Human Behavior*, 48, 94-103.
- Chang, H., Zhang, L., & Xie, G. X. (2015). Message framing in green advertising: The effect of construal level and consumer environmental concern. *International Journal of Advertising*, 34(1), 158-176.
- Coghlan, A., & Carter, L. (2020). Serious games as interpretive tools in complex natural tourist attractions. *Journal of Hospitality and Tourism Management*, 42, 258-265.
- Costa, T., & Lima, M. J. (2018). Cooperation in tourism and regional development. *Tourism & Management*

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

- Deci, E. L., & Ryan, R. M. (1985). Conceptualizations of intrinsic motivation and self-determination. In E. Aronson (Eds.), *Intrinsic motivation and self-determination in human behavior* (pp. 11-40). Springer.
- Deterding, S. (2015). The lens of intrinsic skill atoms: A method for gameful design. *Human-Computer Interaction*, 30(3-4), 294-335.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining “gamification.” *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments, MindTrek 2011* (pp. 9–15). IEEE Computer Society.
- Devlin, S. J., Dong, H. K., & Brown, M. (1993). Selecting a scale for measuring quality. *Marketing research*, 5(3), 12-17.
- Eppmann, R., Bekk, M., & Klein, K. (2018). Gameful Experience in Gamification: Construction and Validation of a Gameful Experience Scale [GAMEX]. *Journal of Interactive Marketing*, 43, 98–115.
- Fennell, D. A. (2021). Technology and the sustainable tourist in the new age of disruption. *Journal of Sustainable Tourism*, 29(5), 767-773.
- Frías-Jamilena, D.M., Polo-Peña, A.I., & Rodríguez-Molina, M. A. (2017). The Effect of Value-Creation on Consumer-Based Destination Brand Equity. *Journal of Travel Research*, 56(8), 1011–1031.
- Frías, D. M., Rodríguez, M. A., & Castañeda, J. A. (2008). Internet vs. travel agencies on pre-visit destination image formation: An information processing view. *Tourism Management*, 29(1), 163–179.
- Ha, I., Yoon, Y., & Choi, M. (2007). Determinants of adoption of mobile games under mobile broadband wireless access environment. *Information & management*, 44(3), 276-286.
- Hair, J.F., Black, W.C., Babin, B.F., and Anderson, R.E. (2009). *Multivariate data analysis*. Prentice Hall.
- Hall, C. M. (2019). Constructing sustainable tourism development: The 2030 agenda and the managerial ecology of sustainable tourism. *Journal of Sustainable Tourism*, 27(7), 1044-1060.
- Hamari, J. (2017). Do badges increase user activity? A field experiment on the effects of gamification. *Computers in Human Behavior*, 71, 469–478.
- Hamari, J., & Koivisto, J. (2015a). Why do people use gamification services? *International Journal of Information Management*, 35(4), 419-431.
- Hamari, J., & Koivisto, J. (2015b). “Working out for likes”: An empirical study on social influence in exercise gamification. *Computers in Human Behavior*, 50, 333–347.

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? - A literature review of empirical studies on gamification. *Proceedings of the Annual Hawaii International Conference on System Sciences* (pp. 3025–3034). IEEE Computer Society.
- Hofman, K., Hughes, K., & Walters, G. (2021). The effectiveness of virtual vs real-life marine tourism experiences in encouraging conservation behaviour. *Journal of Sustainable Tourism*, 1-25.
- Hoffman, D. L., & Novak, T. P. (1996). Marketing in hypermedia computer-mediated environments: Conceptual foundations. *Journal of Marketing*, 60(3), 50–68.
- Holbrook, M. B. (1994). The nature of customer's value: An axiology of service in consumption experience. In R. T. Rust, & R. L. Oliver (Eds.), *Service quality: New directions in theory and practice* (pp. 21–71). Thousand Oaks, CA: Sage Publications.
- Hsu, C. L., & Chen, M. C. (2018). How does gamification improve user experience? An empirical investigation on the antecedences and consequences of user experience and its mediating role. *Technological Forecasting and Social Change*, 132, 118–129.
- Hsu, C. L., Chen, Y. C., Yang, T. N., & Lin, W. K. (2017). Do website features matter in an online gamification context? Focusing on the mediating roles of user experience and attitude. *Telematics and Informatics*, 34(4), 196-205.
- Hunicke, R., LeBlanc, M., & Zubek, R. (2004). MDA: A formal approach to game design and game research. *Proceedings of the AAAI Workshop on Challenges in Game AI* (pp.1-5).
- Huotari, K., & Hamari, J. (2017). A definition for gamification: anchoring gamification in the service marketing literature. *Electronic Markets*, 27(1), 21-31.
- IMI, Inventory, I.M. (1994). Intrinsic motivation inventory (IMI). The Intrinsic Motivation Inventory, Scale description, 1-3. Retrieved from <https://selfdeterminationtheory.org/intrinsic-motivation-inventory/>
- IndexMundi (2019). Perfil población Estados Unidos 2019. Retrieved from https://www.indexmundi.com/es/estados_unidos/poblacion_perfil.html.
- IndexMundi (2019). Perfil población Reino Unido 2019. Retrieved from https://www.indexmundi.com/es/reino_unido/poblacion_perfil.html.
- INE (2020). Frontur. Retrieved from <https://www.ine.es/daco/daco42/frontur/frontur1219.pdf>.
- Kim, Y., & Choi, S.M. (2005). Antecedents of green purchase behavior: an examination of collectivism, environmental concern, and PCE. *Advances in Consumer Research*, 32, 592-599
- Kirk, R. E. (2012). *Experimental design: Procedures for the behavioral sciences*. Sage Publications

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

- Koema (2018). Relación empleo/población Estados Unidos. Retrieved from <https://knoema.es/atlas/Estados-Unidos-de-Am%c3%a9rica/Relaci%c3%b3n-empleopoblaci%c3%b3n>.
- Koema (2018). Relación empleo/población Reino Unido. Retrieved from <https://knoema.es/atlas/Reino-Unido/Relaci%c3%b3n-empleopoblaci%c3%b3n>.
- Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*, 45, 191-210.
- Lee, T. H. (2009). A structural model for examining how destination image and interpretation services affect future visitation behavior: A case study of Taiwan's Taomi eco-village. *Journal of Sustainable Tourism*, 17(6), 727-745.
- Lieberoth, A. (2015). Shallow gamification: Testing psychological effects of framing an activity as a game. *Games and Culture*, 10(3), 229-248.
- Liu, C. R., Wang, Y. C., Huang, W. S., & Tang, W. C. (2019). Festival gamification: Conceptualization and scale development. *Tourism Management*, 74, 370-381.
- Lounis, S., Pramataris, K., & Theotokis, A. (2014). Gamification is all about fun: The role of incentive type and community collaboration. *Proceedings of the European Conference on Information Systems (ECIS)* (pp. 1-14).
- Malhotra, N.K. (2010). *Marketing Research. An applied orientation*. Prentice Hall.
- Merhi, M. I. (2016). Towards a framework for online game adoption. *Computers in Human Behavior*, 60, 253-263.
- Ministerio de Industria, Comercio y Turismo (2019). Directrices Generales de la Estrategia de Turismo Sostenible de España 2030. Retrieved from <https://turismo.gob.es/es-es/estrategia-turismo-sostenible/Documents/directrices-estrategia-turismo-sostenible.pdf>
- Morschheuser, B., Werder, K., Hamari, J., & Abe, J. (2017). How to gamify? A method for designing gamification. *Proceedings of the Annual Hawaii International Conference on System Sciences*, (pp. 1298-1307).
- Oviedo-García, M. Á., Castellanos-Verdugo, M., Vega-Vázquez, M., & Orgaz-Agüera, F. (2017). The Mediating roles of the overall perceived value of the ecotourism site and attitudes towards ecotourism in sustainability through the key relationship ecotourism knowledge-ecotourist Satisfaction. *International Journal of Tourism Research*, 19(2), 203-213.
- Paço, C. M. L., & Pérez, J. M. C. (2015). Assessing the impact of Information and Communication Technologies on the Portuguese hotel sector: an exploratory analysis with Data Envelopment Analysis. *Tourism & Management Studies*, 11(1), 35-43.

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

- Pike, S., Pontes, N., & Kotsi, F. (2021). Stopover destination attractiveness: A quasi-experimental approach. *Journal of Destination Marketing and Management*, 19, 100514.
- Polo-Peña, A. I., Frías-Jamilena, D. M., & Rodríguez- Molina, M. A. (2013). The effect of a destination branding strategy for rural tourism on the perceived value of the conservation of the indigenous resources of the rural tourism destination: the case of Spain. *Current Issues in Tourism*, 16(2), 129-147.
- Polo-Peña, A. I., Frías-Jamilena, D. M., & Rodríguez-Molina, M. A. (2012). The perceived value of the rural tourism stay and its effect on rural tourist behaviour. *Journal of Sustainable Tourism*, 20(8), 1045-1065.
- Robson, K., Plangger, K., Kietzmann, J. H., McCarthy, I., & Pitt, L. (2015). Is it all a game? Understanding the principles of gamification. *Business Horizons*, 58(4), 411-420.
- Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *International Journal of Human Computer Studies*, 74, 14-31.
- Thiel-Ellul, D., & Navarro-Jurado, E. (2014). Aproximación a la sostenibilidad de los destinos turísticos: indicadores sintéticos a través de métodos multicriterio en destinos del litoral andaluz. VI Congreso Latinoamericano de Investigación Turística.
- Torres, P., Augusto, M., & Neves, C. (2022). Value dimensions of gamification and their influence on brand loyalty and word-of-mouth: Relationships and combinations with satisfaction and brand love. *Psychology & Marketing*, 39(1), 59-75.
- UNWTO (2020), Panorama del Turismo Internacional, Edición 2019. Retrieved from <https://www.unwto.org/es/publication/panorama-turismo-internacional-2019>.
- Van Der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly: Management Information Systems*, 28(4), 695-704.
- White, V., McCrum, G., Blackstock, K., & Scott, A. (2006). Indicators and Sustainable Tourism: Literature review. *The Macaulay Institute*, 15, 1-21
- Wolf, I. D., Stricker, H. K., & Hagenloh, G. (2013). Interpretive media that attract park visitors and enhance their experiences: A comparison of modern and traditional tools using GPS tracking and GIS technology. *Tourism Management Perspectives*, 7, 59-72.
- Wu, J., & Liu, D. (2007). The effects of trust and enjoyment on intention to play online games. *Journal of electronic commerce research*, 8(2), 128-140.
- Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism management*, 60, 244-256.

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

- Xu, H., Cui, Q., Ballantyne, R., & Packer, J. (2013). Effective environmental interpretation at Chinese natural attractions: The need for an aesthetic approach. *Journal of Sustainable Tourism*, 21(1), 117-133.
- Yenidogan, A., Gurcaylilar-Yenidogan, T., & Tetik, N. (2021). Environmental management and hotel profitability: operating performance matters. *Tourism & Management Studies*, 17(3), 7-19.
- Yuan, K. H., & Hayashi, K. (2003). Bootstrap approach to inference and power analysis based on three test statistics for covariance structure models. *British Journal of Mathematical and Statistical Psychology*, 56(1), 93-110.
- Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of marketing*, 52(3), 2-22.
- Zhang, J., Adhikari, D., Fahmy, S., & Kang, S. (2020). Exploring the impacts of national image, service quality, and perceived value on international tourist behaviors: A Nepali case. *Journal of Vacation Marketing*, 26(4), 473-488.
- Zuckerman, O., & Gal-Oz, A. (2014). Deconstructing gamification: evaluating the effectiveness of continuous measurement, virtual rewards, and social comparison for promoting physical activity. *Personal and Ubiquitous Computing*, 18(7), 1705–1719.

Capítulo VI: Gamified environmental interpretation as a strategy for improving destination perceived values

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance.

Artículo 3

Autor/es	M. Lina Fernández-Ruano, Dolores M. Frías-Jamilena, Ana I. Polo-Peña, Francisco Peco-Torres.
Título	The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance
Revista	Journal of Destination Marketing & Management
Fecha	Marzo 2022
Volumen, número	23
Páginas-Localizador	100677
DOI	https://doi.org/10.1016/j.jdmm.2021.100677
Índices de Impacto	<p>Datos del Journal Citation Reports último año publicado (2021)</p> <ul style="list-style-type: none"> • Factor de impacto: 7.158 • Cuartil: Q1 • Categoría: HOSPITALITY, LEISURE, SPORT & TOURISM – SSCI; MANAGEMENT – SSCI • Posición 11 de 131 en la categoría de HOSPITALITY, LEISURE, SPORT & TOURISM –SSCI; y posición 43 de 391 de MANAGEMENT.
Indexación en bases de datos	<p>Revista indexada en:</p> <ul style="list-style-type: none"> • Journal Citation Reports • MIAR - Information Matrix for the Analysis of Journals • Scopus • Social Sciences Citation Index • Web of Science

1. Introduction

Fierce competition between tourist destinations requires them to have a competitive advantage in the market (Pike & Page, 2014), and brand equity is considered a key variable to achieve this (Bastos & Levy, 2012). Sound management of brand equity helps secure differentiation in the tourism market, rendering the destination more popular and preferred among tourists, compared to other destinations (Kim & Lee, 2018).

The consumer's perception of a destination's brand value—hereafter, customer-based brand equity (CBBE) or, if it is applied to tourist destinations, customer-based destination brand equity (CBDBE)—begins when they acquire greater knowledge of the destination and evolves as they hold it in incrementally higher regard in terms of image, quality, perceived value, and loyalty. Increasingly in recent decades, CBDBE is also affected by the destination's state of conservation (Negrușă, Toader, Sofică, Tutunea, & Rus, 2015). Hence, it is important that destinations invest in reconciling the development of tourist activities with the protection and conservation of the natural resources that form the very basis of those activities (Blancas, Lozano-Oyola, & González, 2015) and with the long-term development of tourism (Thiel-Ellul & Navarro-Jurado, 2014). The need to strike this balance was further underlined recently by Gossling, Scott, and Hall (2020, p.15) in the context of the COVID-19 pandemic. The latter authors argue that “there is an urgent need not to return to business-as-usual when the crisis [is] over” but instead to focus on delivering “a transformation of the global tourism system more aligned to the SDGs [United Nations Sustainable Development Goals]”. Sustainability is therefore a key factor for competitiveness (Pulido-Fernández, 2004).

The use of environmental interpretation, an environmental education tool (Powell, Vezeau, Stern, Moore, & Wright, 2018), is an effective strategy for building the sustainability of tourist destinations (Ballantyne, Hughes, Lee, Packer, & Sneddon, 2018; Coghlan & Kim, 2012) by encouraging pro-environmental behavior among tourists (Ballantyne et al., 2018). This strategy is also known to generate more satisfying, enjoyable experiences for tourists (Powell & Ham, 2008), leading to positive effects on consumer behavior (Ballantyne et al., 2018). Although the positive effects of environmental interpretation are widely acknowledged, in terms of destination sustainability and different variables of consumer behavior, it is of interest to better understand whether its use improves CBDBE.

To be effective, environmental interpretation must take into account factors linked to its design and the characteristics of the target audience (Powell, Kellert, & Ham, 2009). First, with regard to the design of environmental interpretation, advances in information and communications technologies (ICTs) offer new possibilities, such as the development of gamification experiences that do not rely on *human* interaction, yet still retain the interactivity offered by ICTs (Coghlan & Carter, 2020).

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

Furthermore, the implementation of environmental interpretation using ICTs renders it possible to implement diverse designs, from simple multimedia information brochures, for instance, to gamification. The incorporation of a gamified design offers interesting possibilities because gamified services can transform a participatory experience into one that is intrinsically motivating and enjoyable (Huotari & Hamari, 2012, 2017). It is this potential that has led to the growing interest in establishing whether the implementation of an ICT-based environmental interpretation experience with a gamified design has the capacity to generate a more significant experience for the participant and a greater effect on their behavior compared to the use of a non-gamified version.

Second, with regard to the characteristics of the public at which the environmental interpretation is targeted, the international nature of the tourists must be considered. In the tourism context, scholars have identified that psychological distance influences variables related to CBDDBE such as loyalty (Shin, Chung, Kang, & Koo, 2016), meaning that, under identical circumstances, a stimulus that is perceived to be psychologically near leads to better results in terms of consumer behavior than one perceived to be psychologically distant. This points to the need to identify designs for environmental interpretation that are effective—that is, sensitive to tourists' perceptions of the destination as psychologically near or distant. Hence, it is relevant to examine whether the effectiveness of a gamified environmental interpretation, implemented via ICTs, can be affected by the psychological distance of the tourists.

The objective of the present study, then, is to establish whether the use of gamified environmental interpretation, implemented via ICTs, is an appropriate strategy for achieving greater CBDDBE and whether this effect may be moderated by the tourist's psychological distance relative to the destination. The research seeks to understand whether: 1) participation in an environmental interpretation experience with a gamified design may exert a greater effect on CBDDBE than participation in a non-gamified version; 2) CBDDBE is influenced by the tourist's psychological distance relative to the destination in question; and 3) that psychological distance moderates the effect of environmental interpretation (gamified vs. non-gamified) on CBDDBE.

The study makes several new contributions to the literature. First, it provides greater knowledge about the effectiveness of the use of environmental interpretation in tourist destinations, and about how its use may contribute to developing a competitive advantage based on CBDDBE.

Second, it employs the latest ICTs to design a gamified environmental interpretation experience for tourists, taking into account that the gamification element must be designed and implemented by taking full advantage of its ability to generate an experience that feels personal to each participant.

Third, the study takes into account a particular characteristic of tourists—namely, their psychological distance from the destination—to 1) assess its effect on CBDDBE and 2) based on regulatory construal fit, assess its influence on the effect of

environmental interpretation type (gamified vs. non-gamified) on the achievement of CBDDBE.

2. Literature review

2.1. Environmental interpretation and its effect on CBDDBE

The measurement of CBBE is based on understanding how marketing initiatives impact on consumers' acquisition and recall of brand information (Pike, Bianchi, Kerr & Patti, 2010). According to Keller (1993), CBBE can be conceptualized as "the differential effect of brand knowledge on consumer response to the marketing of the brand." In terms of its scope, including CBDDBE, the majority of studies hold that CBDDBE comprises a number of dimensions that are highly relevant to consumer behavior (Bianchi, Pike, & Lings, 2014). The majority of studies measuring CBBE use the following dimensions: (a) brand awareness; (b) brand quality; (c) brand image; (d) brand value; and (e) brand loyalty (e.g. Kladou & Kehagias, 2014; Pike et al., 2010; Zavattaro, Daspit, & Adams 2015). This suggests that CBDDBE can be considered a consumer behavior variable compatible with the learning potential that can be achieved through environmental interpretation (which also has the scope to influence destination awareness and image). It also indicates that CBDDBE is compatible with destination competitiveness, due to its potential to improve the tourist's experience of the destination and influence its perceived quality, perceived value, and loyalty toward it. However, more recent advances in the specialized literature on CBDDBE, have taken a more all-embracing perspective: that of overall brand equity (OBE) (Yoo & Donthu, 2001). These latter works define OBE as "consumers' different response between a focal brand and an unbranded product when both have the same level of marketing stimuli and product attributes." The present study takes this more holistic perspective of CBDDBE measurement, echoing other recent studies in the tourism field (Frías-Jamilena, Polo-Peña, & Rodríguez-Molina, 2017).

Nevertheless, there are few studies that seek to identify possible antecedents with which to work to improve CBDDBE. Among the exceptions are: Ferns and Walls (2012), which proposes a model to examine the effect of enduring travel involvement on CBDDBE; Frías-Jamilena et al. (2017), which finds that the level of value created by a tourist as a result of their interactions with different participants at the destination is an antecedent of CBDDBE; Frías-Jamilena, Sabiote-Ortiz, Martín-Santana and Beerli-Palacio (2018), which demonstrates the effect of Cultural Intelligence on CBDDBE; and Cano-Guervos, Frías-Jamilena, Polo-Peña and Chica-Olmo (2020), which examines the indirect effects that tourists from a nearby geographical location may exert on CBDDBE, due to their proximity and shared context.

As CBDDBE will be affected by the destination's state of conservation (Negrusa et al., 2015), it is important to strike a healthy balance between tourism-related activities and the protection and conservation of the natural resources that serve as the very

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

basis for those activities (Blancas et al., 2015). In this regard, environmental interpretation is one of the most widely-used tools to educate tourists about the environmental conservation of destinations (Ardoin, Wheaton, Bowers, Hunt, & Durham, 2015). It has also been found to improve the tourist experience (Moncada, Aranguren, & Pellegrini, 2016). From these findings of the literature, it can be inferred that environmental interpretation can be an effective strategy for improving CBDBE, given that this variable is linked to learning about the destination (meaning improved destination awareness and image) and to the enhancement of the tourist experience (which is associated with higher perceived destination quality and perceived value, as well as loyalty).

According to Ham (1992), environmental interpretation translates technically or scientifically complex information into language and ideas that non-experts can readily understand, while enhancing visitor satisfaction. However, various studies on environmental interpretation and its effectiveness call for further research (Coghlan & Carter, 2020), as these types of experiences are complex, involving multiple factors that shape their success or failure (Powell et al., 2009). The present literature review identifies that such influential factors can be broadly grouped into two groups: 1) those related to the design of environmental interpretation experiences and 2) those associated with the characteristics of the participants themselves (Table 1).

Table 1. Factors that influence the effectiveness of environmental interpretation

<p>Factors linked to the design of environmental interpretation experiences</p>	<ol style="list-style-type: none"> 1) Interaction with staff (Ballantyne, Packer, & Hughes, 2009; Botha, Saayman, & Kruger, 2016; Coghlan, Fox, Prideaux, & Lück, 2011; Coghlan & Kim, 2012; Lee, 2009; Powell et al., 2009). 2) Duration (Powell et al., 2009; Wolf, Stricker, & Hagenloh, 2013). 3) Number of interpretive media used—that is, participation in different activities and extent of exposure to the interpretation (Coghlan et al., 2011; Coghlan & Kim, 2012; Kim, 2012; Powell et al., 2009; Weiler & Smith, 2009). 4) Use of ICTs to implement the interpretation (Coghlan & Carter, 2020; Davies, 2014; Hughes, Packer & Ballantyne, 2011; Wolf et al., 2013).
--	---

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

<p align="center">Factors linked to the characteristics of the participants</p>	<ol style="list-style-type: none"> 1) Previous experience of this type of activity, directly linked to environmental sustainability (Coghlan et al., 2011; Kim, 2012; Weiler & Smith, 2009). 2) Subjective norms (Bamberg, 2002; Kim, Airey, & Szivas, 2011). 3) Concern for environmental issues (Ballantyne, Packer, & Falk, 2011; Hughes et al., 2011; Powell et al., 2009). 4) Socio-demographic factors, such as age (Ballantyne et al., 2011; Cheung & Fok, 2014; Kim, 2012), gender (Ballantyne et al., 2011; Kim, 2012; Powell et al., 2009), country of origin (native or foreign) (Ballantyne et al., 2011; Botha et al., 2016; Kim, 2012; Weiler & Smith, 2009), occupation (Cheung & Fok, 2014), salary level (Cheung & Fok, 2014) or educational level (Kim, 2012; Powell et al., 2009).
--	--

Source: The authors

Among the factors associated with the design of environmental interpretation experiences, the literature highlights the potential of ICTs, which can provide design features that sustain interaction with participants without the need for personnel (Coghlan & Carter, 2020), generate opportunities for implementation in other contexts (ibid.), and enhance the tourist experience (Xu, Buhalis, & Weber, 2017; Xu, Tian, Buhalis, Weber & Zhang, 2016). Given this potential offered by ICTs, a step further is to harness technology to incorporate a gamification approach into the interpretation design. The participant's experience of this gamified approach, or its impact on tourist behavior, can then be analyzed. Examining gamification involves building on the contributions of the previous literature, which, in the main, allude only briefly to the inclusion of different games in the interpretation experience (Hughes, Packer & Ballantyne, 2011); other exceptions include works that associate game literature and interpretation with theoretical frameworks linked to gamification (Coghlan & Carter, 2020).

With regard to the individual characteristics of the participants, Table 1 shows that there are variables relating to their particular profile and context that should be taken into account when designing the environmental interpretation experience: previous experience/no previous experience of this type of activity, subjective norms, environmental concern, or sociodemographic variables. The effect of the latter, sociodemographics, on the effectiveness of participation in environmental interpretations has already been analyzed, and, from this starting point, the present study seeks to examine other variables. Considering the international context of

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

touristic activity, it is of interest to select a variable that captures tourists’ perceptions of the psychological distance or nearness of the destination in question. Given the consensus among researchers regarding the importance of psychological distance in individuals’ evaluations and decision-making, and the significant impact it can exert on their behavior (Liberman, Trope, & Wakslak, 2007; Trope, Liberman, & Wakslak, 2007), it is to be expected that psychological distance will also influence the effectiveness of environmental interpretation—meaning that its design needs to be adapted to fit the target audience accordingly. As shown in Table 1, the effectiveness of environmental interpretation experiences on consumer behavior, taking into account their perceived psychological distance from the target audience, has not been analyzed in the literature to date.

The present study seeks to address these gaps in the literature by 1) designing an environmental interpretation experience that takes advantage of the potential of ICTs to incorporate gamification design features and 2) using a factor linked to the characteristics of individual participants, namely psychological distance.

2.2. The use of gamification in environmental interpretation and its effect on CBDDBE

The concept of ‘gamification’ was first used in 2008 in an online blog post, with the first academic research on the topic being published in 2011. Initially, scholars adopted an exclusively systemic perspective on this concept—an approach that was subsequently criticized by some authors for failing to take into account the participant experience (Huotari & Hamari, 2012, 2017). Researchers are now beginning to consider how to measure the experiential aspect of games as this is essential for identifying whether gamification is effective from the end-user perspective and as a fundamental step in determining the impact of that effectiveness on consumer behavior variables (Huotari & Hamari, 2017) (Table 2).

Table 2. Evolution of scholarly study of gamification

Timeframe	Main milestones	Characteristics
2008	First appearance of the term	Described in a blog as: “taking game mechanics and applying them to other web properties to increase Engagement” (Terril, cited in Huotari & Hamari, 2012).
From 2010	Use of gamification in firms	Attracts and retains customers and motivates workers. Success stories include Nike, Samsung, Foursquare and Pepsi (Hsu, Chen, Yang, & Lin, 2017).

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

From 2011 onward	First academic studies published	Researchers show interest in games, aiming to unravel what makes them so enjoyable and motivating (Deterding, 2015).	
	Main definitions and perspectives from which gamification is explored	A broader definition is developed: “The use of game design elements in non-game contexts” (Deterding, Dixon, Khaled, & Nacke, 2011).	Considers gamification from a systemic perspective.
		“Gamification refers to a process of enhancing a service with <i>affordances</i> for <i>gameful</i> experiences in order to support user” overall value creation” (Huotari & Hamari, 2012, 2017).	Considers gamification from a participant experience perspective.
<p>The primary spheres of application of gamification proposed by the literature are education and learning, health and physical fitness, and crowdsourcing.</p> <p>Less prominent areas include: social behavior and networking, business and management, ecological/environmental behavior, e-commerce, marketing and consumer behavior, entertainment, transport, culture, and tourism (Koivisto & Hamari, 2019).</p>			

Source: The authors

Although the literature demonstrates the need to incorporate the participant’s *gameful* experience in any empirical analysis of gamification’s impact, more knowledge and understanding of this perspective are required (Huotari & Hamari, 2017). While a *gameful* experience is considered key to the design and use of gamification features (Hamari, Koivisto, & Sarsa, 2014), there is no consensus on its dimensions, nor on how to measure it (Deterding et al., 2011; Huotari & Hamari, 2017). However, the contributions of Eppmann, Bekk, and Klein (2018) and Liu, Wang, Huang, and Tang (2019) are considered to be of particular importance for this question. The respective scales developed by these authors concur that it is important to include a specific dimension to reflect participants’ enjoyment, while Liu et al. (2019) highlight how important it is for gamification to stimulate the intrinsic motivation of participants.

According to Self-Determination Theory, which is widely applied in research dealing with gamification (Seaborn & Fels, 2015), intrinsic motivation is determined by three basic psychological needs: autonomy, competence, and relatedness. When these

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

needs are satisfied, the subject’s intrinsic motivation improves (Deci & Ryan, 1985). As shown in Table 3, people’s basic needs can be satisfied by participating in a gamified experience supported by a system of *affordances*. The term *affordance* refers to inherent motivational elements that encourage specific activities among participants.

Table 3. Basic psychological needs of motivation, and *affordances* designed to satisfy those needs via a gamified experience

Basic psychological needs	Meaning	<i>Affordances</i> with the capacity to influence the satisfaction of a need	Examples of <i>affordances</i> incorporated into gamified experiences to influence the satisfaction of basic psychological needs
Autonomy	A feeling of being able to choose whether to perform a task or not and of choosing how to do it (Burgers, Eden, van Engelenburg, & Buningh, 2015).	<i>Affordances</i> that give control to the user, enabling them to exercise their own will (Burgers et al., 2015).	Profiles, avatars, privacy control, configurable interface, notification control, alternative activities, non-controlling instructions, levels, narrative.
Competence	Feeling of having the ability to perform the task and achieve the objectives (Xu et al., 2017).	<i>Affordances</i> of challenge and expertise (Xu et al., 2017).	Positive feedback, progressive information, levels, leaderboards, points, challenges, intuitive control, status and badges.

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

<p>Relatedness</p>	<p>Desire to feel connected to other people with a sense of recognition and acceptance (Koivisto & Hamari, 2019).</p>	<p><i>Affordances that enable interaction and connection with other individuals (Xu et al., 2017).</i></p>	<p>Groups, messages, blogs, chat, connection to social networks, collaboration tasks, gifts to other users.</p>
---------------------------	---	--	---

Source: The authors

The ‘enjoyment’ element refers to a specific state of happiness or entertainment generated by a pleasant experience (Merhi, 2016), beyond the specific result achieved out of that experience (Holbrook, 1994). This feeling should be considered a facet of participation in games (Ha, Yoon, & Choi, 2007).

In the context of gamification, enjoyment is understood as spontaneity in users’ interaction with the gamification system (Hamari & Koivisto, 2015a). In other words, enjoyment refers to users’ exploratory and creative behavior when interacting with the system (Hamari & Koivisto, 2015a). The generation of enjoyment helps the participant persevere with the longer-term behaviors promoted by the gamification experience (Deci & Ryan, 1985; Wu & Liu, 2007). Enjoyment also influences how consumers respond to a product innovation (Aroean, 2012), and it also increases people’s interest in making discoveries, such as exploring new ideas or products (Hoffman & Novak, 1996).

Gamification can be considered a valid approach to apply in different contexts (Table 3), as recognized by the literature, which points to spheres including education and learning, health and physical fitness, and crowdsourcing. The tourism and marketing fields, for instance, can be deemed emerging areas that require further research in this regard (Koivisto & Hamari, 2019). In the tourism context, the literature attributes benefits to the use of gamification before, during, and after the trip (Xu et al., 2017). Participation in gamification has been found to generate: a *gameful* (motivating and enjoyment) experience (Huotari & Hamari, 2012, 2017); a better tourist experience (Xu et al., 2017; Xu et al., 2016); a more positive affective and behavioral response to the brand or tourist destination on the part of the participant (Hamari & Koivisto, 2014; Xu et al., 2017); a higher level of satisfaction; and increased loyalty and commitment to the destination (Abou-Shouk & Solliman, 2021; Xu et al., 2017, 2016). In the field of sustainable tourism specifically, studies

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

including those of Souza, Marques, and Veríssimo (2020) and Negrusa et al. (2015) analyze the techniques and applications that must be taken into account when gamification is used to address a conservation problem in destinations specializing in sustainable tourism. In light of these considerations from the literature, it is of value to contribute empirical evidence of the possible superior effect of gamification on a key variable of consumer behavior—namely, CBDBE—compared to the effect of a non-gamified tourist environmental interpretation experience. It is also relevant to capture the participant’s perspective when measuring the *gameful* experience. Based on the literature review, it is anticipated that a gamified environmental interpretation experience will achieve better results in terms of CBDBE than a non-gamified experience. Therefore, the following hypothesis is proposed:

H1. A gamified environmental interpretation experience will have a significantly greater positive effect on CBDBE than a non-gamified environmental interpretation experience.

2.3. The effect of psychological distance on CBDBE

The term ‘psychological distance’ was first used by Lewin (1951) (cited in Van Boven, Kane, McGraw, & Dale, 2010) and later defined by Trope and Liberman (2010) as the “subjective experience that something is close or far away from the self, here, and now”. Psychological distance is defined according to the individual’s perception of how near or distant an object, place, or event—in short, a given stimulus—is from their direct experience. It takes into account temporal distance (*when* that stimulus arises), spatial distance (*where* it arises), social distance (*in relation to whom* it arises) and hypothetical distance (the *likelihood* that it will arise). Even if the stimulus conveys equivalent information to different people, the individual will represent it as psychologically near or distant depending on the perceived distance from his or her direct experience (Miao & Mattila, 2013).

Trope and Liberman (2010) contend that psychological distance comprises the aforementioned dimensions—spatial, temporal, social and hypothetical—and that these are interrelated. This means that what influences one dimension can also influence the rest (Spence, Poortinga, & Pidgeon, 2012).

The main theoretical basis for the concept of psychological distance is construal level theory, which holds that psychological distance is linked to a level of construction or mental conceptualization of perceived reality (Liberman & Trope, 2014; Trope & Liberman, 2010). Thus, psychological distance regulates how the individual perceives the stimulus, such that it will seem safe or uncertain, familiar or strange, similar or different—in short, near or distant. And this perceived distance will fundamentally influence their decisions and behavior (Tan & Chang, 2015). In general terms, the literature demonstrates that the lesser the perceived psychological distance, the greater the effectiveness of marketing actions. Psychological proximity has been found to improve a consumer’s confidence and purchase intention (Darke, Brady,

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

Benedicktus, & Wilson, 2016) as well as brand attitude, preference, and use (Lii, Wu, & Ding, 2013).

In the tourism sphere, psychological distance is considered a key factor in tourist destination visit intention (Shin et al., 2016), attitude (Kim, Kim, Kim, & Magnini, 2016), loyalty (Tan & Chang, 2015), and customer experience (Miao & Mattila, 2013), among other aspects. The present study aims to contribute to the extant literature by providing empirical evidence on the effect of psychological distance on one of the primary variables of consumer behavior, CBDBE—a variable of significant interest, given both its relevance and its complexity. In light of the literature review, it is anticipated that the effect of an environmental interpretation strategy on CBDBE will differ according to the psychological distance perceived by the consumer relative to the interpretation experience (the stimulus). Therefore, the following hypothesis is proposed:

H2. CBDBE will be significantly greater when the consumer perceives the stimulus to be psychologically near than when they perceive it as psychologically distant.

2.4. The moderating effect of psychological distance on the effectiveness of gamified environmental interpretation in terms of CBDBE

The effects of environmental interpretation on consumer behavior variables can be improved if a good match can be achieved between the stimulus and the individual's mindset (Chou & Lien, 2012). One way to achieve this is by “regulatory construal fit”, which involves producing a correspondence between the individual's regulatory focus and the level at which they construe information (Lee, Keller, & Sternthal, 2010).

According to regulatory focus theory (Higgins, 1997), any behavior in pursuit of a goal will be regulated by two different focuses: promotion vs. prevention. Each focus has distinct underlying concerns, such that individuals with a promotion focus tend to be concerned with progress, growth and achievements, while those with a prevention focus are more concerned with their protection, their safety, and their responsibilities (Higgins et al., 2001). People who adopt a promotion focus will be highly sensitive to the presence or absence of positive outcomes, while those presenting a prevention focus will be more sensitive to the presence or absence of negative outcomes (Chou & Lien, 2012).

According to construal level theory, if the individual perceives the stimulus to be psychologically near, a low-level construal is activated, and if they perceive it to be psychologically distant, requiring a greater cognitive effort, a high-level construal will be activated (Trope & Liberman, 2010). Each level is determined by a series of characteristics (Liberman & Trope, 2014). Thus, individuals who perceive the stimulus to be psychologically near construe it in a specific, detailed and subordinate way (a low-level construal), while those who perceive it as psychologically distant will construe it in abstract, general and superordinate terms (a high-level construal) (Liberman & Trope, 2014; Kim et al., 2016). The activation of high-level construal

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

increases the relevance of the desirability of an outcome; and the activation of low level construal increases the relevance of the feasibility of the means necessary to achieve that outcome (Liberman & Trope, 1998; Scarpi, 2021).

On this premise, regulatory construal fit can be achieved (Lee et al., 2010) when a promotion focus is combined with a high-level construal or a stimulus that is perceived to be psychologically distant, or when a prevention focus meets a low-level construal or a perception of psychological nearness. Numerous studies have explored the connection between construal level theory and regulatory focus theory (Chou & Lien, 2012; Lee et al., 2010). These authors began to link regulatory focus with the construal level, considering the attributes that characterize the stimuli to which individuals are exposed.

In the present research, it is hypothesized that environmental interpretation is aligned with a prevention focus and that, therefore, a regulatory construal fit will be produced among individuals with low-level construal (stimulus psychologically near). It is also hypothesized that gamification is aligned with a promotion focus, which will produce a regulatory construal fit among individuals with high-level construal (stimulus psychologically distant). These propositions are based on the premise that one of the major differences between the promotion focus and the prevention focus is that latter is concerned with *preventing negative outcomes*, while the former helps the individual in *achieving positive outcomes* (Chou & Lien, 2012). Furthermore, individuals with a prevention focus regulate their attitudes and behaviors to attain safety and security, whereas those with a promotion focus regulate their attitudes and behaviors to attain growth and achievement (Lee et al., 2010). Hence, any stimulus or message that emphasizes one of these two aspects can be considered to align with one of the two focuses.

A further hypothesis is that the design of a non-gamified environmental interpretation may be particularly associated with a prevention focus because the great majority of environment interpretation experiences emphasize the costs or consequences of failing to take (environmentally-friendly) action as well as the safety of participants (Coghlan et al., 2011; Tan & Law, 2016). For example, Wiener, Needham, and Wilkinson (2009) found that the majority of tourism firms that offered an environmental interpretation service in Hawaii focused solely on the personal safety of participants.

Conversely, the findings of a number of previous studies point to the possibility that a gamified environmental interpretation experience may be aligned with a promotion focus. Ashraf, Razzaque, and Thongpapanl (2016), for example, found that promotion-focused individuals tend to have a hedonic orientation. In a very recent study, Scarpi (2021) demonstrates that hedonism is related to high-level construal (considering hedonism to refer to fun and enjoyment). Previous research has consistently linked enjoyment—one of the basic effects of the *gameful* experience—to the promotion focus and high-level construal. The present research extends this analysis by positing that gamification aligns with a promotion focus, not only due to

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

the ‘enjoyment’ aspect but also the fundamental premise of gamification—that its inherent reward system helps fulfill the participant’s need for achievement (Lee & Higgins, 2009). Gamification is an achievement system (Harwood & Garry, 2015) that shows the participant their progress toward the final goal. Some gamification designs include features such as a progress bar to indicate progress even more clearly (Sigala, 2015). In short, the gamified experience enables participants to fulfill their ideals and emphasizes the goals they can achieve; hence, it can be considered to be consistent with the promotion focus. On this basis, the present study takes this association and extends it, associating a *gamified environmental interpretation experience* with a promotion focus and a *non-gamified* version with a prevention focus.

Therefore, it may be that regulatory construal fit occurs among those individuals who feel psychologically near to the destination and are exposed to a *non-gamified* environmental interpretation experience, and in those who feel psychologically distant from the destination and are exposed to a *gamified* interpretation experience. However, to date, the effect of the design-type of the environmental interpretation experience (gamified vs. non-gamified) and of the characteristics of the participants in terms of their psychological distance (near vs. distant) have not been analyzed jointly. A joint examination of the two factors would make it possible to determine whether a regulatory construal fit between them is possible.

The literature proposes that regulatory construal fit influences consumer behavior variables (Chou & Lien, 2012), generating more positive brand attitude (Chang, Zhang, & Xie, 2015; Lee et al., 2010), greater purchase intention (Chang et al., 2015), willingness to pay a higher price (Mogilner, Aaker, & Pennington, 2008), and improved engagement (Lee et al., 2010).

Based on these findings, it is anticipated that, if there is a regulatory construal fit between the design type of the environmental interpretation experience (gamified vs. non-gamified) and the psychological distance of the individual (near vs. distant), this will be reflected in the CBDDE. An environmental interpretation experience with a gamified design is expected to achieve regulatory construal fit among tourists who perceive that stimulus to be psychologically distant. The following hypotheses are therefore proposed:

H3. The psychological distance perceived by the participant moderates the effect of environmental interpretation type on CBDDE.

H3a. When the participant perceives the stimulus to be psychologically distant, a gamified environmental interpretation experience generates significantly greater CBDDE than a non-gamified environmental interpretation experience.

However, in the case of participants who perceive the stimulus to be psychologically near, the premises of regulatory focus theory indicate that they would gravitate toward a prevention focus, which is more typical of a non-gamified environmental interpretation design (that is, aimed at conveying safety information explaining how

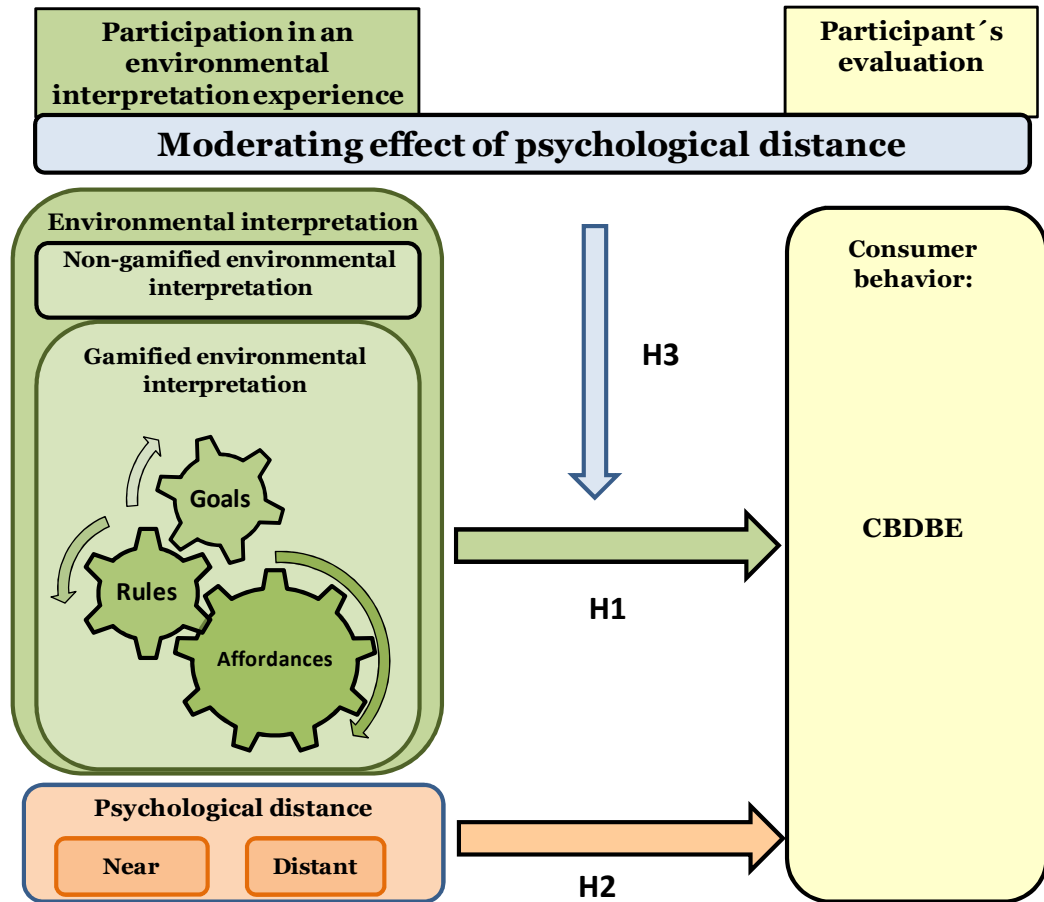
Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

to fulfill their obligations and emphasizing safety). This implies that, according to these premises developed in the literature, a regulatory fit could occur between tourists who perceive the stimulus to be psychologically near and non-gamified environmental interpretation. That said, a gamified environmental interpretation experience still contains, in essence, the same information and characteristics as the more typical non-gamified environmental interpretation. A gamified version therefore provides the features that participants who perceive a lesser psychological distance—those with a prevention-focused regulatory orientation—most desire, because, as noted above, this design explains how to fulfill their obligations and emphasize safety. Huotari and Hamari (2012, 2017) contend that a gamified offer is a package of services comprising a core service that then incorporates a service enhanced by *affordances* that deliver a *gameful* experience for participants, where the enhanced service supports the core service and not the other way around. Thus, the effect on individuals who perceive the stimulus to be psychologically near will not be affected by the *type* of environmental interpretation (gamified vs. non-gamified) to which they are exposed. Therefore, the following hypothesis is proposed:

H3b. When the participant perceives the stimulus to be psychologically near, the type of environmental interpretation (gamified vs. non-gamified) will generate no significant differences in the CBDBE.

Fig. 1 shows the proposed research model, where: participation in a gamified interpretation will generate a greater effect on CBDBE than in a non-gamified version (H1); the participants who perceive the stimulus to be psychologically near will present a higher level of CBDBE than those who perceive it to be psychologically distant (H2); and psychological distance exerts a moderating effect on the relationship between participation in a non-gamified vs. gamified environmental interpretation experience and CBDBE (H3).

Figure 1. Research model proposed



3. Methodology

3.1. Sample and procedure

Spain was chosen as the tourist destination for the present analysis because, for several decades, it has remained among the top five most popular world destinations in terms of international tourist arrivals (UNWTO, 2020). At the same time, there are several issues that put the sustainability of the Spanish tourism sector—and its profitability—at risk in the long term (de Industria and Turismo, 2019), while the sector also needs to be reoriented to stimulate recovery post-pandemic (Ribes-Noguera, Canós-Darós & Santandreu-Mascarell, 2020).

Turning to the methodology, the sample subjects had to meet two conditions to be able to participate in the experiment. They had to be of legal age and never to have visited Spain before, this latter requirement being intended to avoid the possible effect of past experience of the destination on the dependent variable. In line with other studies that deal with more than one nationality, the chosen study population comprised British and American tourists who were potential first-time visitors to Spain (Pike, Pontes, & Kotsi, 2021). Their shared language, English, was the language used in the quasi-experiment on environmental interpretation presented here (both

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

gamified and non-gamified). Furthermore, the United Kingdom and the United States are representative nationalities for Spain (INE, 2020).

Participants were selected via an Internet user panel managed by Dynata. This company has approximately 30 offices in over 20 countries, and has a solid track record in such international research, completing 100 million surveys in 2018 alone. Its Internet user panel comprises over 7 million users in the US and UK, aged 18 years or above. Drawing on this information, the company assisted in the process by accurately selecting the target population and achieving sample representativeness for the study. In the case of quasi-experiments, sample size needs to be geared to enable the treatments to be manipulated in an authentic, non-artificial environment (Zikmund, 1998). Hence, a minimum sample size must be determined that will ensure the statistical tools can be used with a good degree of confidence, meaning that it should be based on the number of treatments proposed in the quasi-experiment.

Initial contact with the participants was made via an email that contained a website link. Those who chose to click on the link were redirected to a secure intranet containing the questionnaires and the experimental stimulus. From this point on, the procedure comprised three steps. In step 1, before being exposed to the experimental stimulus, the participants were asked to respond to an initial questionnaire to gather information on each individual's prior image of Spain, level of environmental concern, and subjective norms. In phase 2, each person was randomly assigned to one of the two experimental treatments (gamified vs. non-gamified multimedia environmental interpretation experience). In the third and final step, participants were exposed to the stimulus and controlled the minimal exposure time in both treatments. Participants were then asked to respond to the second questionnaire, which covered the dependent variable CBDBE, manipulation checks, psychological distance, and the sociodemographic variables gender, age and employment status.

A final sample of 314 valid subjects was thus obtained. The control group comprised individuals exposed to the non-gamified version of the environmental interpretation experience (156 subjects), and the experimental group consisted of individuals exposed to the gamified version (158). As the number of cases per group was very similar, there were assumed to be no problematic issues vis-à-vis the distribution of the groups (Uriel, 1995). Regarding the demographic characteristics of the sample, 41% of the participants were male and 59% female; 17% were between 18 and 29 years old, 24% between 30 and 44, 38% between 45 and 65, and 21% over 65. Finally, 57% were employed and 43% unemployed. The sample distribution therefore largely coincided with the general profile of British and American tourists (IndexMundi, 2019a, 2019b; Koema, 2018a, 2018b).

3.2. Experiment design

A quasi-experiment with a control group and a post-test measure was designed (Zikmund, 1998). This included a treatment variable (environmental interpretation

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

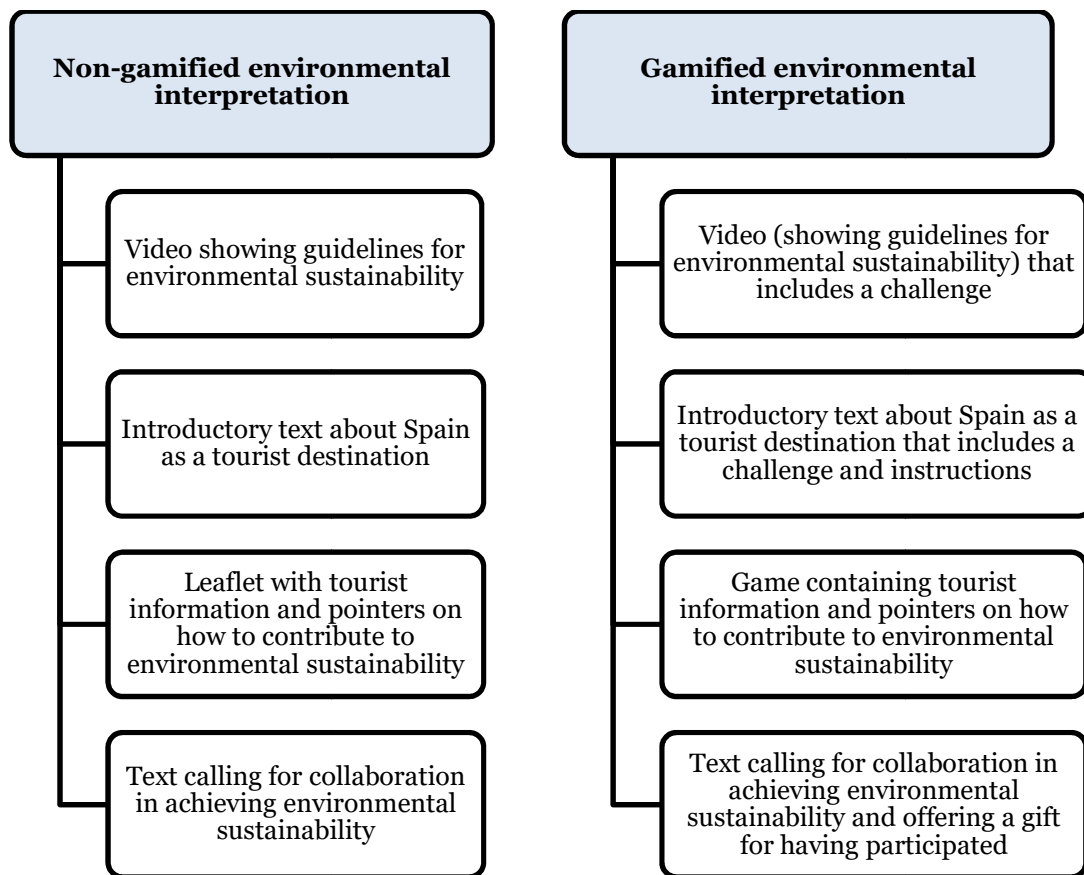
type) and a dependent variable (CBDBE), with a moderating variable (perceived psychological distance). Quasi-experimental designs offer the advantage of external validity, thus enabling the variables to be manipulated in natural settings, which would otherwise be difficult, if not impossible (Zikmund, 1998). Despite their advantages, quasi-experimental designs so present some challenges because it is difficult to rule out variables other than the independent variables as explanations for the evidence identified. However, every effort was made to do so for the differences observed (see control variables listed in section 3.2.2).

3.2.1. Independent variables

Type of environmental interpretation. An environmental interpretation experience delivered in an online format was designed, focusing on one of the phases of the tourist stay only: the pre-stay. This experience featured multimedia content combining audio, text and images, in line with the recommendations of Wolf et al. (2013). To create the content, environmental sustainability guidelines (White, McCrum, Blackstock, & Scott, 2006) and environmental sustainability indicators (Blancas et al., 2015) were adhered-to. The content included practical information on safety and how to act in each location, in accordance with that indicated by Ballantyne et al. (2009). Those authors found that tourists are more receptive to site-specific messages that include practical information, rather than more general environmental conservation data.

Two alternative environmental interpretation experiences were created: 1) non-gamified (multimedia format only) vs. 2) gamified (multimedia gamification format designed to generate a *gameful* experience). Care was taken to ensure equivalence between the two versions in the core environmental interpretation service so that they only differed in the design features pertaining to the two formats; other than that distinction, homogeneous information, word-count and images were provided across the two alternatives (Fig. 2).

Figure 2. Structure of non-gamified vs. gamified environmental interpretation experience



For the non-gamified version, a multimedia tourism leaflet was chosen as the format, as this is among the most widely-used intervention techniques for promoting more sustainable behavior (Froehlich, 2015). The leaflet was divided into three sections, one for each of three types of tourism (‘Beaches’, ‘Historical and Cultural Heritage’, and ‘Natural Resources’). For the , they were shown a map of Spain with icons representing the same three types of tourism. The map was interactive, allowing participants to select the order in which they accessed the three scenarios. By clicking on each one, they were exposed to the corresponding information. They were then able to respond to three questions about what they had read, winning 5 points for every correct answer up to a maximum of 15 points per tourism type and 45 for the whole game. The minimum exposure time for each treatment, including video, was 4 minutes 8 seconds (Appendix 1).

Perceived psychological distance. As perceived psychological distance was not directly observable, this variable was measured using a survey, given that this is known to be a valid means to capture motivations and perceptions (Hernández-Ortega, 2018). Spatial, social, and temporal distance dimensions were all measured on a 2-item, 7-point Likert scale (Appendix 2), as previously used in the literature (Chang et al., 2015; Nenkov, 2012). The scale was validated, presenting adequate validity and reliability values (composite reliability: 0.74; variance extracted: 0.58).

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

On this basis, the scale was recoded using the mean value of the sum of the scale items. At this point, each group of participants in the gamified vs. the non-gamified version was divided in two, according to the median of the variable obtained. The outcome of this process was as follows: 1) Non-gamified environmental interpretation—psychologically near; 2) Non-gamified environmental interpretation—psychologically distant; 3) Gamified environmental interpretation—psychologically near; and 4) Gamified environmental interpretation—psychologically distant.

3.2.2. *Dependent variable and other variables*

Dependent variable. To measure the dependent variable CBDBE, a 4- item, 7- point Likert scale developed by Yoo and Donthu (2001) was used, this having been applied to the tourism sector in previous studies (Frías-Jamilena et al., 2017) (Appendix 2). This overall measure of CBDBE has a high correlation with other scales that measure this concept based on its dimensions (Frías-Jamilena et al., 2017).

Experimental manipulation check. To ensure that the factor manipulation was performed correctly, measurements were taken to test whether the gamified environmental interpretation successfully delivered a *gameful* experience. To measure *gameful* experience, a scale covering both intrinsic motivation and enjoyment was validated. For intrinsic motivation, the 7-point Likert scales developed by Lieberoth (2015) were used to measure three dimensions: 3 items for autonomy, 5 items for competence, and 3 items for relatedness. Enjoyment was measured on the 7-point, 4-item Likert scale developed by Van der Heijden (2004) and later used by Hamari and Koivisto (2015a) (Appendix 2).

Control variables. To correctly relate the factors manipulated in the experiment with the dependent variable, the control variables ‘prior destination image’, ‘environmental concern’ and ‘subjective norms’ (Malhotra, 2010) were employed. The three variables were measured before the subjects were exposed to the treatments, as recommended by some authors (Kirk, 1995). Prior destination image was measured using 4 items on a 7-point semantic differential scale, similar to the approach of other studies (Beerli & Martín, 2004; Frías-Jamilena et al., 2017). To measure participants’ environmental concern, 5 items were applied to a 7-point Likert scale, again previously used by other authors (Chang et al., 2015; Kim & Choi, 2005). Finally, subjective norms were measured via 4 items on a 7-point Likert scale, once again as per previous studies (Hamari & Koivisto, 2015b) (Appendix 2).

Sociodemographic variables. The last part of the questionnaire gathered a series of sociodemographic variables (including gender, age, and employment status), and established the respondent’s level of experience of electronic games. Four intervals were used to measure age, while the employment measure was coded into two categories, employed and not employed. In line with previous studies (Ibañez, Di-Serio, & Delgado-Kloos, 2014; Liu & Shiue, 2014), the level of experience of computer games was measured on the basis of whether the individual had ever

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

played a game on a computer/a tablet/a mobile phone or not, and, if they responded in the affirmative, how long they had been doing so.

4. Analysis of the results

To test the hypothesis proposed in this research, a variance analysis (ANOVA) was conducted using CBDBE as the dependent variable and ‘environmental interpretation type’ and ‘psychological distance’ as independent variables. Prior to this, however, the validity and reliability of the scales needed to be validated, and the presence of selection bias in the sample had to be ruled out.

4.1. Scale validation

To test the proposed hypotheses, scale validation was performed for CBDBE, *gameful* experience (as a second-order construct comprising four dimensions (autonomy, competence, relatedness, and enjoyment), and the control variables (prior image, environmental concern, and subjective norms) using confirmatory factor analysis (CFA). First, the psychometric properties of the proposed model were evaluated. Since the multivariate normality test of the variables included in the proposed model proved significant, the estimation was best conducted using the maximum likelihood method combined with bootstrapping (Yuan & Hayashi, 2003). Given the high degree of convergent validity (determined through the reliability and validity of the variables, see Table 4) and discriminant validity—since the correlation was not greater than 0.80 (Bagozzi, 1994) and the confidence interval of the estimated coefficient did not include the value “1” (Anderson & Gerbing, 1988)—the value of each of these variables could be calculated based on the sum value of its items (Hair, Black, Babin, & Anderson, 2009: 126–7).

Table 4. Composite reliability and average variance extracted of the measurement scales

Variable	Composite Reliability	Average Variance Extracted
<i>Gameful</i> experience (second-order construct)	0.76	0.46
Autonomy	0.93	0.83
Competence	0.94	0.77
Relatedness	0.93	0.82
Enjoyment	0.95	0.84

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

CBDDE	0.88	0.65
Environmental concern	0.93	0.73
Prior image	0.97	0.89
Subjective norms	0.93	0.78
Goodness-of-fit of the model: Global fit of the model: Normed chi-square=1.99, RMSEA=0.08; incremental fit: CFI=0.92, IFI=0.92, TLI=0.92.		

4.2. Sample selection bias

Since, in quasi-experiments, there is no random assignment of subjects to groups, it is imperative to ensure that selection bias does not occur (D’Agostino, 1998). To check for the presence of selection bias in this study, association was analyzed using a series of covariates that, according to the literature, affect environmental interpretation—namely, gender (Ballantyne et al., 2011; Powell et al., 2009), age (Ballantyne et al., 2011; Cheung & Fok, 2014), and employment status (Cheung & Fok, 2014), together with variables that could affect the results of gamification, primarily, level of experience with electronic games (Ibañez et al., 2014; Liu & Shiue, 2014). Association tests were conducted for the different groups and the covariates (age: $\chi^2=7.977$; $df=9$; $p\text{-value}=0.536$; employment: $\chi^2=12.038$; $df=18$; $p=0.845$; gender: $\chi^2=0.229$; $df=3$; $p\text{-value}=0.973$; experience of electronic games: $\chi^2=27.416$; $df=21$; $p\text{-value}=0.157$). There were no instances of a significant level being reached. These results affirm the absence of subject selection bias and thus avoid the need to verify the results using other, more complex, techniques (Zanutto, Lu, & Hornik, 2005).

4.3. Manipulation check

To check that the manipulated factor produced the desired effects, an ANOVA was performed to compare the means for that factor. The results showed that the mean differences for *gameful* experience were significant ($M_{\text{gamified}}=5.01$; $M_{\text{non-gamified}}=4.73$, $p\text{-value}\leq 0.05$).

4.4. Concomitant variables

The effect of the factors on the dependent variable was controlled or using ‘prior destination image’, ‘environmental concern’, and ‘subjective norms’ as covariates. According to Kirk (1995), the use of a covariate is suitable if it fulfills the following criteria: 1) it is related to the dependent variable and 2) it is not related to the independent variables. To verify the first requirement, the Pearson correlation between each of the three aforementioned variables and the dependent variable, CBDDE, was calculated. The results showed a significant correlation in all cases

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

($r_{\text{image}}=0.475$, $p\text{-value} \leq 0.01$; $r_{\text{environmental concern}}=0.294$, $p\text{-value} \leq 0.01$; and $r_{\text{subjective norms}}=0.360$, $p\text{-value} \leq 0.01$), hence all covariates met the first criterion. To check the second criterion, an ANOVA was performed for each covariate, using the covariate as the dependent variable and the four different groups of the quasi-experiment as the independent variables, thus: 1) Non-gamified—psychologically near; 2) Non-gamified— psychologically distant; 3) Gamified—psychologically near; and 4) Gamified— psychologically distant. For all three covariates, the results showed a significant relationship between the groups and the covariate (prior image: $F=8.85$, $p\text{-value} \leq 0.00$; environmental concern: $F=8.43$, $p\text{-value} \leq 0.00$; subjective norms: $F=4.75$, $p\text{-value} \leq 0.00$), therefore they did not fulfill the second requirement for being included as covariates.

4.5. Testing the proposed hypotheses

Based on these results, it was deemed appropriate to test the proposed hypotheses via an ANOVA, using CBDDBE as the dependent variable and ‘environmental interpretation type’ and ‘psychological distance’ as independent variables.

The main effect of environmental interpretation type on CBDDBE was significant, the mean for the gamified environmental interpretation experience being greater than the non-gamified version (non-gamified $M=4.27$ vs. gamified $M=4.65$). The difference between the two means was also significant ($F=6.22$, $p\text{-value} \leq 0.01$) Therefore, H1 finds empirical support H1 (Table 5).

Table 5. Results of ANOVA analyses

	Sum of squares	Degrees of freedom	Mean squares	F	P-value
Design type of environmental interpretation	11.205	1	11.205	6.22	0.01
Perceived psychological distance	85.58	1	85.58	54.75	0.00
Interpretation type x psychological distance	7.45	1	7.45	4.89	0.02

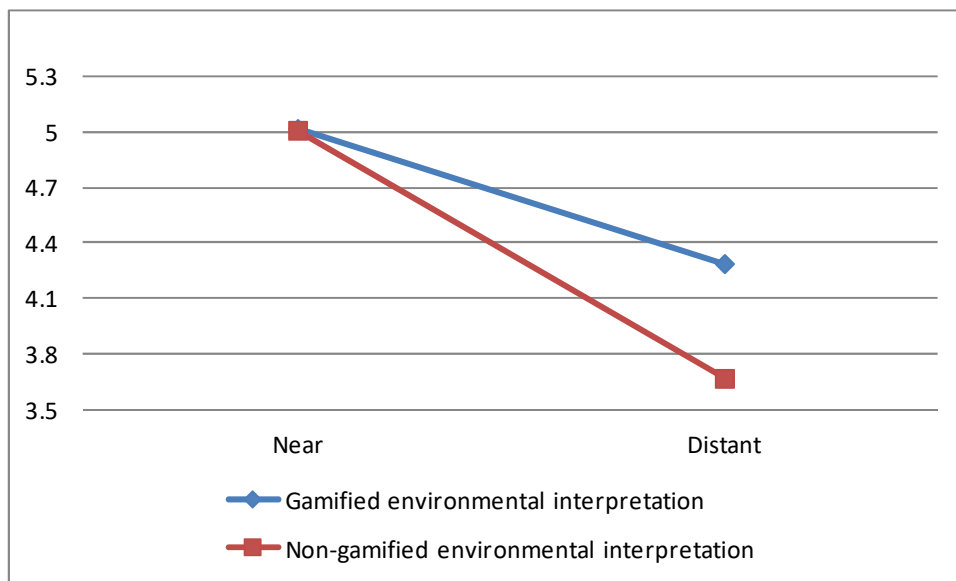
The main effect of psychological distance on CBDDBE was also significant, the mean for psychologically near being greater than that for psychologically distant ($M_{\text{near}}=5.02$; $M_{\text{distant}}=3.97$); here, too, the difference between the two means was significant ($F=54.75$, $p\text{-value} \leq 0.01$) Therefore, individuals who perceived the stimulus to be psychologically near gave higher values to CBDDBE than those who

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

perceived it to be psychologically distant. H2 therefore obtains empirical support (Table 5).

Finally, in interpreting the main effects, the fact that the interaction between environmental interpretation type and psychological distance is significant (Table 5 and Fig. 3) must be taken into account. H3 proposes that the psychological distance perceived by the participant moderates the effect of environmental interpretation type on CBDBE ($p \leq 0.05$). Tukey's test was performed, with the results indicating that CBDBE is significantly higher among individuals who perceive psychological distance when exposed to a gamified environmental interpretation experience compared to a non-gamified version ($p\text{-value} \leq 0.01$), which provides empirical support to H3a. However, in this case, Tukey's test showed that, when the participant perceived psychological nearness, a gamified environmental interpretation experience does not generate any significant differences in CBDBE values, compared to a non-gamified version ($p=0.99$). These findings confirm H3b (Figure 3).

Figure 3. Interaction effect of environmental interpretation type and psychological distance on CBDBE



Prior to the ANOVA, the fulfillment of three fundamental conditions was confirmed (Ordaz, Melgar, & Rubio, 2010): 1) independence was fulfilled as this was an inter-subject study; 2) normality was unproblematic since the sample comprised 314 individuals; and 3) homoscedasticity also posed no issue, since the groups were approximately the same size (Uriel, 1995).

5. Discussion of the results and conclusions

The primary objective of tourism managers is to maximize the competitiveness of their destinations by implementing branding strategies. One means of achieving this is to improve brand equity (Bastos & Levy, 2012; Pike & Page, 2014). However, in contrast to the past, it is now essential that efforts to achieve greater destination

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

competitiveness be based on strategies that contribute to achieving greater sustainability of the destination and also the achievement of the United Nations Sustainable Development Goals (SDGs) (Gossling et al., 2020; Koens et al., 2020). All such strategies must also take into account the current challenging circumstances generated by the COVID-19 pandemic. In reorienting strategies in this direction, it is a priority to identify those strategies that can reactivate the sector and boost CBDDE.

The present study sought to provide original insights into whether the use of ICT-based environmental interpretation—incorporating a gamified design—is a viable strategy for enhancing CBDDE and whether this effect may be modified by tourist psychological distance. From an academic point of view, the study has provided empirical evidence indicating that: 1) participation in a gamified environmental interpretation experience does indeed exert a greater effect on CBDDE than in the case of a non-gamified version (for this, a quasi-experiment using two environmental interpretation formats was created: a non-gamified multimedia leaflet format and a gamified one, which not only included game elements but was also carefully designed to create a *gameful* experience); 2) CBDDE is influenced by tourists' perceived psychological distance from the destination (psychological distance was measured considering the spatial, social, and temporal dimensions and dividing the groups according to perceived psychological distance—near vs. distant); and 3) psychological distance from the destination moderates the effect of environmental interpretation type (gamified vs. non-gamified) on CBDDE.

This research makes several interesting contributions to the literature on CBDDE. First, the results show that the format of the environmental interpretation design has a significant effect on CBDDE (as also found in previous studies). The literature shows continued interest in better understanding whether gamification can be considered a valid strategy for the competitive improvement of tourist destinations (e.g. Abou-Shouk & Soliman, 2021; Xu et al., 2016, 2017); and, on this point, the present study enquires into whether the format—gamified vs. non-gamified—influences the outcomes of the environmental interpretation experience (Ardoin et al., 2015). Gamified environmental interpretation was found to yield better results than the non-gamified version in terms of the CBDDE variable, which constitutes a new contribution to the literature in the tourist destination context. This finding is consistent with the previous literature that also found this to be the case for other contexts of application and in relation to other consumer behavior variables (e.g. Hamari & Koivisto, 2014; Xu et al., 2017). These results constitute a step forward in the literature dealing with the question of how to promote sustainable tourism destinations.

This study also considers gamification from the participant's perspective via the measurement of the *gameful* experience and its effectiveness in achieving a highly relevant variable for tourist destination competitiveness: CBDDE. Here, the question of how to best measure a *gameful* experience and which scales to apply (Eppmann et al., 2018; Högber, Hamari, & Wästlund, 2019; Koivisto & Hamari, 2019; Leclercq,

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

Poncin, & Hammedi, 2020) remains a topic of interest to the literature. In the present study, a new scale is developed to measure the degree of intrinsic motivation—autonomy, competence, and relatedness—and enjoyment achieved by the participants during the gamified environmental interpretation. It should be remembered that the *gameful* experience is a complex construct and, consequently, its measurement is necessarily complex also. With that in mind, the contribution of this work constitutes an important step toward the generalization of the measurement of this construct.

The decision to study gamification was based on the link identified by the literature between this approach and improvements in the complete tourist experience (Xu et al., 2017). Furthermore, this perspective addresses a research gap, in that there is no previous research examining the effects of gamification on the improvement of the tourist experience resulting from environmental interpretation activity, and more research is required on the use of ICTs in this educational tool (Tan & Law, 2016). The rationale for analyzing perceived psychological distance is that it is known to exert a fundamental influence on the decisions and assessments that individuals make (Lieberman et al., 2007; Trope et al., 2007). Until now, no studies have captured prior data on the effects of psychological distance on the environmental interpretation format.

Second, the results show that tourists who perceive the destination to be psychologically distant deliver inferior results in terms of CBDDBE, meaning that the environmental interpretation experience will be less effective among tourists with this profile. These are new findings in relation to CBDDBE and are in line with previous studies that note a correlation between psychological nearness and greater effectiveness of marketing actions based on other consumer behavior variables such as trust and purchase intention (Darke et al., 2016), brand preference and use (Lii et al., 2013), or value co-creation (Holmqvist, Guest, & Grönroos, 2015). This points to the need to identify more effective strategies particularly aimed at tourists who feel psychologically distant from the destination—a need that provides the basis for the final contribution of the study, outlined next.

Finally, the results confirmed the moderating effect of perceived psychological distance on the relationship between gamification and CBDDBE. Again, in a new finding, the study identified that, when the individual perceives the destination to be psychologically distant, a gamified environmental interpretation experience generates significantly higher CBDDBE than the non-gamified version. However, when they perceive it to be psychologically near, there are no significant differences in CBDDBE between the gamified and non-gamified versions. This can be explained by the fact that the core service provided by the environmental interpretation is the same in both cases (Huotari & Hamari, 2012). This result confirms the existence of a regulatory construal fit, and gamification is therefore recommended as an effective strategy for targeting tourists who perceive the destination as being psychologically distant, which is especially relevant considering that they presented worse results in

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

the CBDBE. Furthermore, the results demonstrate the effectiveness of gamification for both types of tourists (psychologically near vs. distant). These results add a valuable dimension to the many extant studies that show the importance of fit between the stimulus and the individual's mind (Chou & Lien, 2012). They also constitute a further step toward a fuller understanding of the efficacy of the use of gamification, which is of particular interest to the specialist gamification literature (Hamari et al., 2014; Koivisto & Hamari, 2019; Seaborn & Fels, 2015). The present study demonstrates its effectiveness in relation to the behavior of potential tourists in destinations with an international profile.

The present research is relevant to the literature dealing with gamification, psychological distance, and the possibilities of regulatory construal fit, as it proposes a novel research model that jointly studies the potential for a fit between both the factors that shape the environmental interpretation experience (gamified vs. non-gamified) and also those affecting the participants (psychologically near vs. distant).

The present analysis, which builds on the previous contributions to the literature, successfully associates a gamified environmental interpretation experience (promotion focus and high construal level) with a non-gamified environmental interpretation experience (prevention focus and low construal level). The evaluation of both scenarios, based on an empirical study and a quasi-experimental design (in which participation in a gamified environmental interpretation vs. a non-gamified version was manipulated and the subjects were self-classified according to their psychological distance from the destination), provided empirical evidence of a regulatory construal fit that leads to greater effectiveness of the environmental interpretation experience in terms of its impact on CBDBE. While the literature has pointed to the need to study how the fit of one type of interpretation vs. another may be determined by the characteristics of participants (e.g. Ballantyne et al., 2018; Kim, 2012; Powell et al., 2009), this can be considered an original contribution as no previous study, as far as could be determined, has jointly analyzed the factors that influence the interpretation experience itself (gamified vs. non-gamified) and those that affect the participants (psychologically near vs. distant), together with the potential fit between them.

6. Practical implications, limitations and future research directions

From a practical point of view, the results have several implications for both public and private entities, as well as for travel agencies, not least in contributing to the efforts toward achieving the SDGs and revitalizing a sector so gravely affected by the COVID-19 pandemic. The present study demonstrates, in particular, the effectiveness of environmental interpretation delivered via gamified online media in the pre-stay phase, which is critical to tourist decision-making as COVID-19 restrictions start to be lifted. Tourist destinations can improve the experience of potential tourists in the pre-stay phase by offering this gamified experience. This is an effective strategy for

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

increasing CBDDE while promoting the environmental conservation of the destination. Both objectives are fundamental for many mature tourist destinations (such as in the case of Spain) in continuing to attract tourists over the medium–long term.

In the pre-stay phase, information-search is critical to tourists' decision to opt for one destination over another. In this regard, the possibilities offered by ICTs have altered not only how people find information about destinations and make their travel purchases but also how they experience, communicate and perceive destinations (Agapito & Lacerda, 2013). Although environmental interpretation tends to obtain superior results when it involves interaction with tour guides (Ballantyne et al., 2009; Coghlan et al., 2011; Coghlan & Kim, 2012), gamification enables tourists to explore the destination in an innovative, interactive and personalized way (Xu et al., 2016). It also makes a greater impact in the online environment (Hsu et al., 2017), which can help mitigate the absence of the typical interaction with tour-guides that is characteristic of traditional environmental interpretation. Based on the above, and in light of the results of the present work, it is suggested that one way for tourism firms and those responsible for tourist destinations to improve destination competitiveness is to implement a gamified environmental interpretation experience. The gamification can be delivered via online media and has the potential to generate motivation and enjoyment among participants that, in turn, will produce greater destination brand equity.

With regard to the design of the gamified environmental interpretation, the results of this study also provide valuable insights to managers and other sector professionals. As firms are increasingly showing interest in the uses of gamification to achieve various objectives linked to consumer behavior, it is important to pay attention to its design. However, this should not be merely limited to game-like elements or focus exclusively on systemic design features (Huotari & Hamari, 2017). Rather, the design process must consider the specific objectives the gamification needs to fulfill and the context in which it will be applied—that is, the gamification elements need to employ the appropriate *affordances* that lead the consumer to enjoy a *gameful* experience, as was achieved in the case of the gamified environmental interpretation used in this work. Here, the priority was to 1) adopt a holistic perspective of gamification, giving careful thought to which game elements to build into the design to optimize its *experiential* dimension, 2) evaluate the suitability of the objectives to be achieved via gamification, and 3) design a combination of challenges, *affordances*, and rules that would motivate participants to learn about how to improve the sustainability of a tourist destination while *enjoying* that participation. It is also important to evaluate the outcomes of the gamification to discern whether it has proved successful and is capable of producing the desired effects on consumer behavior variables. Hence, if tourism-sector business owners are seeking to test the suitability of the gamification strategy they have implemented, they should start by evaluating the variables of intrinsic motivation (autonomy, competence, and relatedness) and enjoyment among

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

the participants, as the present study demonstrates. The scale proposed here can be used by sector professionals to test the *gameful* experience and the suitability of the gamification design.

Finally, destination managers need to adapt their market-oriented strategies according to consumers' psychological distance. This is a particularly critical aspect when one considers the international nature of tourism and the need to appeal to diverse target audiences. Given that the greater the psychological distance, the more the effectiveness of marketing actions may suffer, valid strategies need to be identified for reaching those tourists who perceive the destination to be psychologically distant. In this scenario, it is useful to know that the use of gamification (in this case applied to environmental interpretation) has been found to be an effective strategy to target tourists who, based on their perceptions, feel psychologically distant from the destination, given its positive impact in terms of higher CBDBE values. The use of gamification was also found to be effective among tourists who perceive the destination to be psychologically near. In this collective, both gamified and non-gamified environmental interpretation types are equally effective in terms of CBDBE. In this case, managers can opt for either strategy.

Overall, the results of this study suggest that managers and professionals in the tourism sector will find that gamified environmental interpretation is especially effective among tourists who perceive the destination to be psychologically distant, but it also works well for those who perceive the destination as near. All in all, it is a highly-recommendable strategy that addresses the different preferences that the international tourist market may present (based on the perceived psychological distance of the destination), and that is also well-aligned with the possibilities offered by the Internet to access a globalized market.

6.1. Limitations and future research directions

Like all research, the present study is shaped by certain limitations that could be addressed in future research. First, although a tourist destination that is recognized for its leading position in incoming international tourism was selected, it would be interesting to replicate this study to determine whether the use of environmental interpretation is effective in different mature tourist destinations that do not specialize in nature tourism. Regarding the present sample of international tourists and the psychological distance they perceived relative to the tourist destination (Spain), it would be valuable for future studies to use samples of tourists of other nationalities or conduct research in different tourist destinations, as this could lend further solidity to the present results and render them more generalizable. It could also be of value to compare the effectiveness of the gamified environmental interpretation strategy with respect to domestic tourists.

Second, other future research directions could include different factors that may affect environmental interpretation and its outcomes, such as cultural differences among tourists. This research could also be performed in other phases of the tourist

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

experience—during the stay and post-stay—in which different factors would play a role.

Third, it would be interesting to consider how the different characteristics of consumers (such as profiles of origin, languages, culture, motivation, or prior destination experience, among others) may affect destination brand equity. Other relevant variables associated with the *gameful* experience and consumer behavior could also be examined, and these would need to be linked to the actions that tourism destinations could implement to improve their performance while simultaneously improving their sustainability.

Finally, a particularly relevant research focus at present is that of the consequences of the COVID-19 pandemic. It would be of interest to make advances in the study of the effectiveness of gamified environmental interpretation in terms of certain variables that are particularly critical for tourist destinations at present. These include the adoption of behaviors aimed at improving perceived safety at the destination in extraordinary circumstances, such as the current health crisis generated by COVID-19.

7. References

- Abou-Shouk, M., & Solliman, M. (2021). The impact of gamification adoption intention on brand awareness and loyalty in tourism: The mediating effect of customer engagement. *Journal of Destination Marketing & Management*, 20 (June), 100559. <https://doi.org/10.1016/j.jdmm.2021.100559>
- Agapito, D., & Lacerda, A. (2014). Marketing and brand design of destination experiences: The role of ICT. *Journal of Spatial and Organizational Dynamics*, 2(3), 201-216.
- Anderson, J.C., & Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411. <https://doi.org/10.1037/0033-2909.103.3.411>
- Ardoin, N.M., Wheaton, M., Bowers, A.W., Hunt, C.A., & Durham, W.H. (2015). Nature-based tourism's impact on environmental knowledge, attitudes, and behavior: a review and analysis of the literature and potential future research. *Journal of Sustainable Tourism*, 23(6), 838–858. <http://doi.org/10.1080/09669582.2015.1024258>
- Aroean, L. (2012). Friend or Foe: In enjoying playfulness, do innovative consumers tend to switch brand? *Journal of Consumer Behaviour*, 11(1), 67–80. <http://doi.org/10.1002/cb.370>
- Ashraf, A.R., Razzaque, M.A., & Thongpapanl, N.T. (2016). The role of customer regulatory orientation and fit in online shopping across cultural contexts. *Journal of Business Research*, 69(12), 6040–6047. <http://doi.org/10.1016/j.jbusres.2016.05.019>

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- Bagozzi, R. P. (1994). Structural equation models in marketing research: Basic principles. *Principles of marketing research*, 3(1), 7-385.
- Ballantyne, R., Hughes, K., Lee, J., Packer, J., & Sneddon, J. (2018). Visitors' values and environmental learning outcomes at wildlife attractions: Implications for interpretive practice. *Tourism Management*, 64, 190–201. <https://doi.org/10.1016/j.tourman.2017.07.015>
- Ballantyne, R., Packer, J., & Hughes, K. (2009). Tourists' support for conservation messages and sustainable management practices in wildlife tourism experiences. *Tourism Management*, 30(5), 658–664. <http://doi.org/10.1016/j.tourman.2008.11.003>
- Ballantyne, R., Packer, J., & Falk, J. (2011). Visitors' learning for environmental sustainability: Testing short- and long-term impacts of wildlife tourism experiences using structural equation modelling. *Tourism Management*, 32(6), 1243–1252. <https://doi.org/10.1080/13504622.2010.540644>
- Bamberg, S. (2002). Effects of implementation intentions on the actual performance of new environmentally friendly behaviours - Results of two field experiments. *Journal of Environmental Psychology*, 22(4), 399–411. <https://doi.org/10.1006/jevp.2002.0278>
- Bastos, W., & Levy, S.J. (2012). A history of the concept of branding: Practice and theory. *Journal of Historical Research in Marketing*, 4(3), 347-368. <https://doi.org/10.1108/17557501211252934>
- Beerli, A., & Martín, J.D. (2004). Factors influencing destination image. *Annals of Tourism Research*, 31(3), 657-681. <https://doi.org/10.1016/j.annals.2004.01.010>
- Bianchi, C., Pike, S., & Lings, I. (2014). Investigating attitudes towards three South American destinations in an emerging long haul market using a model of consumer-based brand equity (CBBE). *Tourism Management*, 42, 215–223. <http://doi.org/10.1016/j.tourman.2013.11.014>
- Blancas, F.J., Lozano-Oyola, M., & González, M. (2015). A European sustainable tourism labels proposal using a composite indicator. *Environmental Impact Assessment Review*, 54, 39-54. <https://doi.org/10.1016/j.eiar.2015.05.001>
- Botha, E., Saayman, M., & Kruger, M. (2016). Clustering Kruger National Park visitors based on interpretation. *South African Journal of Business Management*, 47(2), 75–88. <https://doi.org/10.4102/sajbm.v47i2.62>
- Burgers, C., Eden, A., Van Engelenburg, M.D., & Buningh, S. (2015). How feedback boosts motivation and play in a brain-training game. *Computers in Human Behavior*, 48, 94–103. <https://doi.org/10.1016/j.chb.2015.01.038>
- Cano-Guervos, R., Frías-Jamilena, D.M., Polo Peña, A.I., & Chica Olmo, J. (2020). Influence of tourist geographical context on customer-based destination brand

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- equity: An empirical analysis. *Journal of Travel Research*, 59(1), 107-119. <https://doi.org/10.1177/0047287518815979>
- Chang, H., Zhang, L., & Xie, G.X. (2015). Message framing in green advertising: The effect of construal level and consumer environmental concern. *International Journal of Advertising*, 34(1), 158-176. <https://doi.org/10.1080/02650487.2014.994731>
- Cheung, L.T.O., & Fok, L. (2014). Assessing the role of ecotourism training in changing participants' pro-environmental knowledge, attitude and behaviour. *Asia Pacific Journal of Tourism Research*, 19(6), 645-661. <https://doi.org/10.1080/10941665.2013.797003>
- Chou, H.Y., & Lien, N.H. (2012). The effects of incentive types and appeal regulatory framing in travel advertising. *Service Industries Journal*, 32(6), 883-897. <https://doi.org/10.1080/02642069.2010.545878>
- Coghlan, A., & Carter, L. (2020). Serious games as interpretive tools in complex natural tourist attractions. *Journal of Hospitality and Tourism Management*, 42, 258-265. <https://doi.org/10.1016/j.jhtm.2020.01.010>
- Coghlan, A., & Kim, A.K. (2012). Interpretive layering in nature-based tourism: A simple approach for complex attractions. *Journal of Ecotourism*, 11(3), 173-187. <https://doi.org/10.1080/14724049.2012.712135>
- Coghlan, A., Ruth Fox, K., Prideaux, B., & Lück, M. (2011). Successful interpretation in great barrier reef tourism: Dive in or keep out of it? *Tourism in Marine Environments*, 7(3-4), 167-178. <https://doi.org/10.3727/154427311X13195453162813>
- D'Agostino, R.B. (1998). Tutorial in biostatistics: Propensity score methods for bias reduction in the comparison of a treatment to a nonrandomized control group. *Statistics in Medicine*, 17(19), 2265-2281.
- Darke, P.R., Brady, M.K., Benedicktus, R.L., & Wilson, A.E. (2016). Feeling close from afar: The role of psychological distance in offsetting distrust in unfamiliar online retailers. *Journal of Retailing*, 92(3), 287-299. <https://doi.org/10.1016/j.jretai.2016.02.001>
- Davies, J. (2014). On-site digital heritage interpretation: Current uses and future possibilities at World Heritage Sites. *Durham: Durham University*, (September), 1-90.
- Deci, E.L., & Ryan, R.M. (1985). Conceptualizations of intrinsic motivation and self-determination. In *Intrinsic Motivation and Self-Determination in Human Behavior* (pp. 11-40). New York, NY: Springer.
- Deterding, S. (2015). The lens of intrinsic skill atoms: A method for gameful design. *Human-Computer Interaction*, 30(3-4), 294-335. <https://doi.org/10.1080/07370024.2014.993471>

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining “gamification.” In *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments, MindTrek 2011* (pp. 9–15).
- Eppmann, R., Bekk, M., & Klein, K. (2018). Gameful Experience in Gamification: Construction and Validation of a Gameful Experience Scale [GAMEX]. *Journal of Interactive Marketing, 43*, 98–115. <https://doi.org/10.1016/j.intmar.2018.03.002>
- Ferns, B.H., & Walls, A. (2012). Enduring travel involvement, destination brand equity, and travelers’ visit intentions: A structural model analysis. *Journal of Destination Marketing & Management, 1*(1-2), 27-35. <https://doi.org/10.1016/j.jdmm.2012.07.002>
- Frías Jamilena, D.M., Polo Peña, A.I., & Rodríguez Molina, M.Á. (2017). The effect of value-creation on consumer-based destination brand equity. *Journal of Travel Research, 56*(8), 1011–1031. <https://doi.org/10.1177/0047287516663650>
- Frías-Jamilena, D.M., Rodríguez-Molina, M.A., Castañeda-García, J.A. (2008). Internet vs. travel agencies on pre-visit destination image formation: An information processing view. *Tourism Management, 29*(1), 163-179. <https://doi.org/10.1016/j.tourman.2007.02.020>
- Frías-Jamilena, D.M., Sabiote-Ortiz, C., Martín-Santana, J.D. y Beerli-Palacio, A. (2018). The effect of cultural intelligence on consumer-based destination brand equity. *Annals of Tourism Research, 72*, 22-36. <https://doi.org/10.1016/j.annals.2018.05.009>
- Froehlich, J. (2015). Gamifying green: gamification and environmental sustainability. *The Gameful World, 563–596*. Cambridge: MIT Press
- Gossling, S., Scott, D., & Hall, C.M. (2020). Pandemics, tourism and global change: A rapid assessment of COVID-19. *Journal of Sustainable Tourism, 29*(1), 1–20. <https://doi.org/10.1080/09669582.2020.1758708>
- Ha, L., Yoon, Y., & Choi, M. (2007). Determinants of adoption of mobile games under mobile broadband wireless access environment. *Information & Management, 44*(3), 276-286. <https://doi.org/10.1016/j.im.2007.01.001>
- Hair, J.F., Black, W.C., Babin, B.F., and Anderson, R.E.. (2009). *Multivariate data analysis*. Madrid: Prentice Hall.
- Ham, S.H. (1992). *Environmental interpretation: a practical guide for people with big ideas and small budgets*. Colorado: North American Press.
- Hamari, J., & Koivisto, J. (2014). Measuring flow in gamification: Dispositional Flow Scale-2. *Computers in Human Behavior, 40*, 133–143. <https://doi.org/10.1016/j.chb.2014.07.048>

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- Hamari, J., & Koivisto, J. (2015a). Why do people use gamification services? *International Journal of Information Management*, 35(4), 419-431. <https://doi.org/10.1016/j.ijinfomgt.2015.04.006>
- Hamari, J., & Koivisto, J. (2015b). "Working out for likes": An empirical study on social influence in exercise gamification. *Computers in Human Behavior*, 50, 333–347. <https://doi.org/10.1016/j.chb.2015.04.018>
- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? - A literature review of empirical studies on gamification. In *Proceedings of the Annual Hawaii International Conference on System Sciences* (pp. 3025–3034). IEEE Computer Society.
- Harwood, T., & Garry, T. (2015). An investigation into gamification as a customer engagement experience environment. *Journal of Services Marketing*, 29(6–7), 533–546. <https://doi.org/10.1108/JSM-01-2015-0045>
- Hernández-Ortega, B. (2018). Don't believe strangers: online consumer reviews and the role of social psychological distance. *Information & Management*, 55(1), 31-50. <https://doi.org/10.1016/j.im.2017.03.007>
- Higgins, E.T. (1997). Beyond pleasure and pain. *American psychologist*, 52(12), 1280-1300.
- Higgins, E.T., Friedman, R.S., Harlow, R.E., Idson, L.C., Ayduk, O.N., & Taylor, A. (2001). Achievement orientations from subjective histories of success: Promotion pride versus prevention pride. *European Journal of Social Psychology*, 31(1), 3-23.
- Hoffman, D.L., & Novak, T.P. (1996). Marketing in hypermedia computer-mediated environments: Conceptual foundations. *Journal of Marketing*, 60(July), 50–68. <https://doi.org/10.2307/1251841>
- Högberg, J., Hamari, J., & Wästlund, E. (2019). Gameful experience questionnaire (GAMEFULQUEST): An instrument for measuring the perceived gamefulness of system use. *User Modeling and User-Adapted Interaction*, 29(3), 619-660. <https://doi.org/10.1007/s11257-019-09223-w>
- Holbrook, M.B. (1994). The nature of customer value: An axiology of services in the consumption experience. *Service Quality: New directions in theory and practice*, 21-71. Newbury Park, CA: Sage.
- Holmqvist, J., Guest, D., & Grönroos, C. (2015). The role of psychological distance in value creation. *Management Decision*, 53(7), 1430–1451. <https://doi.org/10.1108/MD-06-2014-0335>
- Hsu, C.L., Chen, Y.C., Yang, T.N., & Lin, W.K. (2017). Do website features matter in an online gamification context? Focusing on the mediating roles of user experience and attitude. *Telematics and Informatics*, 34(4), 196–205. <https://doi.org/10.1016/j.tele.2017.01.009>

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- Hughes, K., Packer, J., & Ballantyne, R. (2011). Using post-visit action resources to support family conservation learning following a wildlife tourism experience. *Environmental Education Research*, 17(3), 307–328. <https://doi.org/10.1080/13504622.2010.540644>
- Huotari, K., & Hamari, J. (2012). Defining gamification: a service marketing perspective. In Proceeding of the 16th international academic MindTrek conference (pp. 17-22).
- Huotari, K., & Hamari, J. (2017). A definition for gamification: anchoring gamification in the service marketing literature. *Electronic Markets*, 27(1), 21–31. <https://doi.org/10.1007/s12525-015-0212-z>
- Ibanez, M.B., Di-Serio, A., & Delgado-Kloos, C. (2014). Gamification for engaging computer science students in learning activities: A case study. *IEEE Transactions on Learning Technologies*, 7(3), 291–301. <https://doi.org/10.1109/TLT.2014.2329293>
- IndexMundi (2019a). Perfil población Estados Unidos 2019. Retrieved 15.01.2020 from https://www.indexmundi.com/es/estados_unidos/poblacion_perfil.html.
- IndexMundi (2019b). Perfil población Reino Unido 2019. Retrieved 15.01.2020 from https://www.indexmundi.com/es/reino_unido/poblacion_perfil.html.
- Industria, M., & Turismo, C. y (2019). Directrices Generales de la Estrategia de Turismo Sostenible de España 2030. Retrieved 04.05.2020 from <https://turismo.gob.es/es-es/estrategia-turismo-sostenible/Documents/directrices-estrategia-turismo-sostenible.pdf>
- INE (2020). Frontur. Retrieved 15.01.2020 from <https://www.ine.es/daco/daco42/frontur/frontur1219.pdf>.
- IMI, Inventory, I.M. (1994). Intrinsic motivation inventory (IMI). The Intrinsic Motivation Inventory, Scale description, 1-3. Retrieved 03.05.2018. from <https://selfdeterminationtheory.org/intrinsic-motivation-inventory/>
- Keller, K.L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing*, 57(1), 1-22.
- Kim, A.K.J. (2012). Determinants of tourist behaviour in coastal environmental protection. *Tourism Geographies*, 14(1), 26–49. <https://doi.org/10.1080/14616688.2011.597774>
- Kim, A. K. J., Airey, D., & Szivas, E. (2011). The multiple assessment of interpretation effectiveness: Promoting visitors' environmental attitudes and behavior. *Journal of Travel Research*, 50(3), 321–334. <https://doi.org/10.1177/0047287510362786>
- Kim, Y., & Choi, S.M. (2005). Antecedents of green purchase behavior: An examination of collectivism, environmental concern, and PCE. *Advances in Consumer Research*, 32, 592–599.

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- Kim, J., Kim, P.B.C., Kim, J.E., & Magnini, V.P. (2016). Application of construal-level theory to promotional strategies in the hotel industry. *Journal of Travel Research*, 55(3), 340–352. <https://doi.org/10.1177/0047287514550097>
- Kim, H.K., & Lee, T.J. (2018). Brand equity of a tourist destination. *Sustainability*, 10(2), 1-22. <https://doi.org/10.3390/su10020431>
- Kirk, R.E. (1995). *Experimental design: Procedures for the Behavioral Sciences* (3rd ed.). Pacific Grove, CA: Brooks/Cole.
- Kladou, S. & Kehagias, J. (2014). Assessing destination brand equity: An integrated approach. *Journal of Destination Marketing and Management*, 3(1), 2–10. <https://doi.org/10.1016/j.jdmm.2013.11.002>
- Koema (2018a). Relación empleo/población Estados Unidos. Retrieved 15.01.2020 from <https://knoema.es/atlas/Estados-Unidos-de-Am%c3%a9rica/Relaci%c3%b3n-empleopoblaci%c3%b3n>.
- Koema (2018b). Relación empleo/población Reino Unido. Retrieved 15.01.2020 from <https://knoema.es/atlas/Reino-Unido/Relaci%c3%b3n-empleopoblaci%c3%b3n>.
- Koens, K., Klijs ,J., Weber-Sabil, J., Melissen, F., Lalicic, L., Mayer, I., Önder, I., & Aall, C. (2020). Serious gaming to stimulate participatory urban tourism planning. *Journal of Sustainable Tourism*, 1-20. <https://doi.org/10.1080/09669582.2020.1819301>
- Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*, 45, 191-210. <https://doi.org/10.1016/j.ijinfomgt.2018.10.013>
- Lee, T.H. (2009). A structural model for examining how destination image and interpretation services affect future visitation behavior: A case study of Taiwan's Taomi eco-village. *Journal of Sustainable Tourism*, 17(6), 727–745. <https://doi.org/10.1080/09669580902999204>
- Leclercq, T., Poncin, I., & Hammedi, W. (2020). Opening the black box of gameful experience: Implications for gamification process design. *Journal of Retailing and Consumer Services*, 52, 101882. <https://doi.org/10.1016/j.jretconser.2019.07.007>
- Lee, A.Y., & Higgins, E.T. (2009). The persuasive power of regulatory fit. *Social Psychology of Consumer Behavior*, 319-333. New York, NY: Psychology Press
- Lee, A.Y., Keller, P.A., & Sternthal, B. (2010). Value from regulatory construal fit: The persuasive impact of fit between consumer goals and message concreteness. *Journal of Consumer Research*, 36(5), 735-747. <https://doi.org/10.1086/605591>
- Lieberman, N., & Trope, Y. (2014). Traversing psychological distance. *Trends in Cognitive Sciences*, 18(7), 364-369. <https://doi.org/10.1016/j.tics.2014.03.001>
- Lieberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- theory. *Journal of Personality and Social Psychology*, 75(1), 5-18. <https://doi.org/10.1037/0022-3514.75.1.5>
- Liberman, N., Trope, Y., & Wakslak, C. (2007). Construal level theory and consumer behavior. *Journal of Consumer Psychology*, 17(2), 113–117. [https://doi.org/10.1016/S1057-7408\(07\)70017-7](https://doi.org/10.1016/S1057-7408(07)70017-7)
- Lieberoth, A. (2015). Shallow gamification: Testing psychological effects of framing an activity as a game. *Games and Culture*, 10(3), 229–248. <https://doi.org/10.1177/1555412014559978>
- Lii, Y.S., Wu, K.W., & Ding, M.C. (2013). Doing good does good? Sustainable marketing of CSR and consumer evaluations. *Corporate Social Responsibility and Environmental Management*, 20(1), 15–28. <https://doi.org/10.1002/csr.294>
- Liu, H.J., & Shiue, Y. C. (2014). Influence of Facebook game players' behavior on flow and purchase intention. *Social Behavior and Personality*, 42(1), 125–133. <https://doi.org/10.2224/sbp.2014.42.1.125>
- Liu, C.R., Wang, Y.C., Huang, W.S., & Tang, W.C. (2019). Festival gamification: Conceptualization and scale development. *Tourism Management*, 74, 370–381. <https://doi.org/10.1016/j.tourman.2019.04.005>
- Malhotra, N.K. (2010). *Marketing Research. An applied orientation*. New Jersey: Prentice Hall.
- Merhi, M.I. (2016). Towards a framework for online game adoption. *Computers in Human Behaviour*, 60, 253-263. <https://doi.org/10.1016/j.chb.2016.02.072>
- Miao, L., & Mattila, A.S. (2013). The impact of other customers on customer experiences: A psychological distance perspective. *Journal of Hospitality and Tourism Research*, 37(1), 77–99. <https://doi.org/10.1177/1096348011425498>.
- Mogilner, C., Aaker, J.L., & Pennington, G.L. (2008). Time will tell: The distant appeal of promotion and imminent appeal of prevention. *Journal of Consumer Research*, 34(5), 670-681. <https://doi.org/10.1086/521901>
- Moncada, J.A., Aranguren, J., & Pellegrini, N. (2016). Los senderos transitados: Una mirada al estado del arte de la interpretación ambiental en Venezuela entre 2000 y 2015. *Revista de Investigación*, 40(88), 15–37.
- Negrușă, A.L., Toader, V., Sofică, A., Tutunea, M.F., & Rus, R.V. (2015). Exploring gamification techniques and applications for sustainable tourism. *Sustainability*, 7(8), 11160-11189. <https://doi.org/10.3390/su70811160>
- Nenkov, G.Y. (2012). It's all in the mindset: Effects of varying psychological distance in persuasive messages. *Marketing Letters*, 23(3), 615-628.
- Ordaz, J., Melgar, M.C., & Rubio, C. (2014). *Métodos estadísticos y Económicos en la empresa y para finanzas*. Sevilla: Universidad Pablo de Olavide.

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- Pike, S., Bianchi, C., Kerr, G., & Patti, C. (2010). Consumer-based brand equity for Australia as a long-haul tourism destination in an emerging market. *International Marketing Review*, 27(4), 434–449. <https://doi.org/10.1108/02651331011058590>
- Pike, S., & Page, S.J. (2014). Destination marketing organizations and destination marketing: A narrative analysis of the literature. *Tourism management*, 41, 202–227. <https://doi.org/10.1016/j.tourman.2013.09.009>
- Pike, S., Pontes, N., & Kotsi, F. (2021). Stopover destination attractiveness: A quasi-experimental approach. *Journal of Destination Marketing & Management*, 19(March), 1–8. <https://doi.org/10.1016/j.jdmm.2020.100514>
- Powell, R.B., & Ham, S.H. (2008). Can ecotourism interpretation really lead to pro-conservation knowledge, attitudes and behaviour? Evidence from the Galapagos Islands. *Journal of Sustainable Tourism*, 16(4), 467–489. <https://doi.org/10.2167/jost797.0>
- Powell, R.B., Kellert, S.R., & Ham, S.H. (2009). Interactional theory and the sustainable nature-based tourism experience. *Society and Natural Resources*, 22(8), 761–776. <https://doi.org/10.1080/08941920802017560>
- Powell, R.B., Vezeau, S.L., Stern, M.J., Moore, D.W.D., & Wright, B.A. (2018). Does interpretation influence elaboration and environmental behaviors? *Environmental Education Research*, 24(6), 875–888. <https://doi.org/10.1080/13504622.2017.1339302>
- Pulido-Fernández, J.I. (2004). El medio ambiente en la política turística española. *QPE-Revista Electrónica*, 7(7), 93–114.
- Ribes-Noguera, P., Canós-Darós, L., & Santandreu-Mascarell, C. (2020). Consecuencias del estado de alarma por crisis sanitaria de COVID-19 en el sector turístico español. Working paper, Universitat Politècnica de València, Valencia.
- Scarpi, D. (2021). A construal-level approach to hedonic and utilitarian shopping orientation. *Marketing Letters*, 32(2), 261–271. <https://doi.org/10.1007/s11002-021-09558-8>
- Seaborn, K., & Fels, D.I. (2015). Gamification in theory and action: A survey. *International Journal of Human-Computer Studies*, 74, 14–31. <https://doi.org/10.1016/j.ijhcs.2014.09.006>
- Shin, S., Chung, N., Kang, D., & Koo, C. (2016). How far, how near psychological distance matters in online travel reviews: A test of construal-level theory. *Information and Communication Technologies in Tourism 2016*, 355–368. New York, NY: Springer International Publishing.
- Sigala, M. (2015). The application and impact of gamification funware on trip planning and experiences: the case of TripAdvisor’s funware. *Electronic Markets*, 25(3), 189–209. <https://doi.org/10.1007/s12525-014-0179-1>

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- Souza, V.S., Marques, S.R.B. de V., & Veríssimo, M. (2020). How can gamification contribute to achieve SDGs?: Exploring the opportunities and challenges of ecogamification for tourism. *Journal of Hospitality and Tourism Technology*, 11(2), 255–276. <https://doi.org/10.1108/JHTT-05-2019-0081>
- Spence, A., Poortinga, W., & Pidgeon, N. (2012). The psychological distance of climate change. *Risk Analysis*, 32(6), 957–972. <https://doi.org/10.1111/j.1539-6924.2011.01695.x>
- Tan, W.K. & Chang, Y.G. (2015). Electronic-word-of-mouth performance in different psychological distances and familiarity. *Online Information Review*, 39(4), 449–465. <https://doi.org/10.1108/OIR-10-2014-0255>
- Tan, E. & Law, R. (2016). mLearning as a softer visitor management approach for sustainable tourism. *Journal of Sustainable Tourism*, 24(1), 132-152. <https://doi.org/10.1080/09669582.2015.1049610>
- Thiel-Ellul, D., & Navarro-Jurado, E. (2014). Aproximación a la sostenibilidad de los destinos turísticos: indicadores sintéticos a través de métodos multicriterio en destinos del litoral andaluz. VI Congreso Latinoamericano de Investigación Turística, 1-26.
- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, 117(2), 440-482. <https://doi.org/10.1037/a0018963>
- Trope, Y., Liberman, N., & Wakslak, C. (2007). Construal levels and psychological distance. *Journal of Consumer Psychology*, 17(2), 83–95. [https://doi.org/10.1016/S1057-7408\(07\)70013-X](https://doi.org/10.1016/S1057-7408(07)70013-X)
- UNWTO (2020), Panorama del Turismo Internacional, Edición 2019. Retrieved 04.05.2020 from <https://www.unwto.org/es/publication/panorama-turismo-internacional-2019>.
- Uriel, E. (1995). Análisis de datos. Series temporales y análisis multivariante. Madrid: Editorial AC.
- Van Boven, L., Kane, J., McGraw, A.P., & Dale, J. (2010). Feeling close: Emotional intensity reduces perceived psychological distance. *Journal of Personality and Social Psychology*, 98(6), 872–885. <https://doi.org/10.1037/a0019262>
- Van der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, 28(4), 695–704. <https://doi.org/10.2307/25148660>
- Walker, K., & Moscardo, G. (2014). Encouraging sustainability beyond the tourist experience: Ecotourism, interpretation and values. *Journal of Sustainable Tourism*, 22(8), 1175–1196. <https://doi.org/10.1080/09669582.2014.918134>
- Weiler, B., & Smith, L. (2009). Does more interpretation lead to greater outcomes? An assessment of the impacts of multiple layers of interpretation in a zoo

Capítulo VII: The use of gamification in environmental interpretation and its effect on customer-based destination brand equity: The moderating role of psychological distance

- context. *Journal of Sustainable Tourism*, 17(1), 91–105. <https://doi.org/10.1080/09669580802359319>
- White, V., McCrum, G., Blackstock, K.L., & Scott, A. (2006). Indicators and sustainable tourism: Literature review. *The Macaulay Institute*, 15, 1-21.
- Wiener, C.S., Needham, M.D., & Wilkinson, P .F. (2009). Hawaii's real-life marine park: Interpretation and impacts of commercial marine tourism in the Hawaiian Islands. *Current Issues in Tourism*, 12(5–6), 489–504. <https://doi.org/10.1080/13683500902736855>
- Wolf, I.D., Stricker, H.K., & Hagenloh, G. (2013). Interpretive media that attract park visitors and enhance their experiences: A comparison of modern and traditional tools using GPS tracking and GIS technology. *Tourism Management Perspectives*, 7, 59–72. <https://doi.org/10.1016/j.tmp.2013.04.002>
- Wu, J., & Liu, D. (2007). The effects of trust and enjoyment on intention to play online games. *Journal of electronic commerce Research*, 8(2), 128-140.
- Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism Management*, 60, 244–256. <https://doi.org/10.1016/j.tourman.2016.11.020>
- Xu, F., Tian, F., Buhalis, D., Weber, J., & Zhang, H. (2016). Tourists as Mobile Gamers: Gamification for Tourism Marketing. *Journal of Travel and Tourism Marketing*, 33(8), 1124–1142. <https://doi.org/10.1080/10548408.2015.1093999>
- Yoo, B., & Donthu, N. (2001). Developing and validating a multidimensional consumer-based brand equity scale. *Journal of Business Research*, 52(1), 1–14. [https://doi.org/10.1016/S0148-2963\(99\)00098-3](https://doi.org/10.1016/S0148-2963(99)00098-3)
- Yuan, K.H., & Hayashi, K. (2003). Bootstrap approach to inference and power analysis based on three test statistics for covariance structure models. *British Journal of Mathematical and Statistical Psychology*, 56(1), 93-110. <https://doi.org/10.1348/000711003321645368>
- Zanutto, E.L., Lu, B., & Hornik, R. (2005). Using propensity score subclassification for multiple treatment doses to evaluate a National Anti-Drug Media Campaign. *Journal of Educational and Behavioral Statistics*, 30(1), 59–73. <https://doi.org/10.3102/10769986030001059>
- Zavattaro, S.M., Daspit, J.J., & Adams, F.G. (2015). Assessing managerial methods for evaluating place brand equity: A qualitative investigation. *Tourism Management*, 47, 11-21. <https://doi.org/10.1016/j.tourman.2014.08.018>
- Zikmund, W.G. (1998). *Essentials of Marketing Research*. New York, NY: Harcourt Brace College Publishers.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance.

Artículo 4

Autor/es	Dolores M.Frías-Jamilena, M.Lina Fernández-Ruano, Ana I. Polo-Peña
Título	Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance
Revista	Tourism Management
Fecha	Agosto 2022
Volumen	91
Páginas	104519
DOI	https://doi.org/10.1016/j.tourman.2022.104519
Índices de Impacto	<p>Datos del Journal Citation Reports último año publicado (2021)</p> <ul style="list-style-type: none"> • Factor de impacto: 12.879 • Cuartil: Q1 Categoría: ENVIRONMENTAL STUDIES-SSCI; HOSPITALITY, LEISURE, SPORT & TOURISM – SSCI; MANAGEMENT - SSCI • Posición 2 de 131 en el área de HOSPITALITY, LEISURE, SPORT & TOURISM – SSCI; 3 de 391 en el área de MANAGEMENT – SSCI y 3 de 169 en el área de ENVIRONMENTAL STUDIES-SSCI.
Indexación en bases de datos	<p>Revista indexada en:</p> <ul style="list-style-type: none"> • Bibliographie Touristique • Contents Pages in Management • Geographical Abstracts: Human Geography • International Development Abstracts • Leisure, Recreation and Tourism Abstracts • PsycINFO • RePEc • Scopus • Social Sciences Citation Index • Travel and Tourism Index

1. Introduction

Environmental sustainability is a key factor for destination competitiveness (Pulido-Fernández, Cárdenas-García and Espinosa-Pulido, 2019) and it helps stimulate continued touristic activity (Scott, Hall and Gössling, 2019). Researchers and professionals in the sector continue to search for solutions and strategies that may contribute to mitigating the negative effects of tourists' interaction with the chosen destination (Becken, Whittlesea, Loehr and Scott, 2020; Hall, 2019). A key option that can help alleviate these negative effects is a change in tourist behavior, toward more environmentally-aware conduct (Dolnicar, 2020; Juvan and Dolnicar, 2017).

Environmental interpretation is one strategy that has been shown to be effective in promoting pro-environmental behaviors (Ardoin, Wheaton, Bowers, Hunt and Durham, 2015). Environmental interpretation has been linked to a possible improvement in participants' responses on three levels: cognitive, affective, and behavioral (Roberts, Mearns and Edwards, 2014; Weiler and Ham, 2010). However, the results of the environmental interpretations analyzed in the literature have shown that they do not consistently deliver the desired effect (Ardoin et al., 2015; Lee, Jan and Chen, 2021), perhaps because there are so many influences that shape pro-environmental tourist conduct (Gössling, 2018a; Wicker and Becker, 2013). A better understanding of the factors that may play a role in the impact and effectiveness of interpretation activities is thus required (Ballantyne, Hughes, Lee, Packer and Sneddon, 2021; Powell, Vezeau, Stern, Moore and Wright, 2018). The present study therefore seeks to contribute to our understanding of some of these factors.

Among other factors, design considerations and, related to these, the particular characteristics of the target public both influence the impact of any environmental interpretation endeavor (Powell, Kellert and Ham, 2009). Regarding the design dimension, information and communications technologies (ICTs) hold the potential for highly-engaging formats that can prove enriching and supportive of sustainable development. One such example is gamification, which can be offered at different stages of the tourist stay (Gössling, 2021). The literature has raised certain doubts regarding just how useful gamification may be in terms of stimulating the adoption of pro-environmental behaviors (e.g., Aguiar-Castillo; Rufo-Torres, Saa-Pérez and Pérez-Jiménez, 2018). But there are also studies that suggest it may be effective in encouraging change toward more environmentally-aware behaviors (Douglas and Brauer, 2021; Gössling, 2018b; Johnson, Horton, Mulcahy and Foth, 2017; Ouariachi, Li and Elving, 2020) because it can directly enhance the visitor experience (Xu, Buhalis and Weber, 2017). This indicates that gamification may be a suitable strategy for improving environmental interpretation results. A participatory experience can be elevated by gamification so that it proves truly motivating and enjoyable for the individual (Huotari and Hamari, 2012, 2017). Furthermore, applying gamification to environmental interpretation—following the systematic design specifications recommended by the literature and taking into account the participants' perspective

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

on the experience or its effects on their behavior—contributes to addressing the gaps of interest identified by the literature.

Turning to the characteristics of the target public, here it is important to consider that a destination is visited by both domestic and international tourists, each of whom will feel a different sense of connection to that destination. With regard to how tourists *experience* environmental interpretation, psychological distance is a critical variable that shapes and differentiates their preferences (Lee, Scott and Wang, 2021; Trope, Liberman and Wakslak, 2007). This means that, under identical circumstances, a stimulus that is perceived to be psychologically near leads to a more positive response than one perceived to be psychologically distant. In the tourism context, for example, the literature identifies that psychological distance influences variables associated with pro-environmental behavior, such as intention to adopt pro-environmental behavior, pro-environmental attitude, environmental threat perception, or commitment to the environment (Chang, Zhang and Xie, 2015; Jones, Hine and Marks, 2017).

Among the approaches that can contribute to destination sustainability, then, is to identify strategies that can trigger a change in tourist behavior toward more environmentally-aware conduct (Dolnicar, 2020; Juvan and Dolnicar, 2017). Taking into account the gaps detected in the literature on this question, the aim of the present study is to contribute to improving the sustainability of a destination using gamified environmental interpretation to enhance pro-environmental knowledge, attitude, and behavior among tourists. In addition, the moderating effect of the tourist's psychological distance from the destination is tested. The study endeavors to determine whether a *gamified* environmental interpretation experience has a greater effect on the participant's pro-environmental knowledge, attitude, and behavior than a non-gamified version; whether these three variables are influenced by the participant's perception of the destination, in terms of its psychological distance or nearness; and whether psychological distance moderates the effect of (gamified vs. non-gamified) environmental interpretation on these three variables.

This paper is organized as follows. First, we present the conceptual framework and a review of the relevant literature that supports the proposed hypotheses, regarding the effect of *gamified* environmental interpretation on participants' pro-environmental knowledge, attitude, and behavior; the moderating effect of psychological distance; and regulatory construal fit. We then describe the quasi-experiment undertaken, analyze its results, and discuss their implications in terms of testing the research hypotheses. Finally, we discuss our conclusions and the managerial implications of the findings, along with the limitations of the study and potential directions for future research.

2. Literature review

2.1. Environmental interpretation and its impact on tourist behavior in support of sustainable tourism

Sustainability is positioned as a primary factor in destination competitiveness, a joint vision embracing all economic, social, and environmental variables must be adopted to achieve a symbiosis between tourism and sustainability (Pulido-Fernández et al., 2019).

To help alleviate these negative consequences and work toward a more sustainable tourism sector, UNWTO (2017) notes that a change in policies, business practices, and tourist behavior can contribute to the sustainable development of countries. On the question of how to change tourist behavior, previous research points to the use of an informational strategy geared to enhancing the knowledge and attitude of recipients and, in turn, modifying their behaviors (Delmas, Fischlein and Asensio, 2013). Information-provision is one of the most widely-used strategies (Abrahamse and Matthies, 2018). For example, informational strategies may constitute an important element in the implementation of structural strategies such as legal regulations (Steg and Vlek, 2009).

However, information alone is not enough to change behavior. It needs to be accompanied by a solid justification so that the behavioral change occurs effectively and is maintained over time, and this can be achieved in an educational context (Lehman and Geller, 2004). Fernández and Ramos (2015) observe that environmental education “consists of that which is aimed at resolving concrete problems. It means that individuals ... clearly perceive the problems hindering individual and collective well-being, identify their causes and determine the means of resolving them”. Yet, despite the importance of environmental education, there has been little research on the impact that tourist knowledge may have on the environmental sustainability of destinations, with the exception of some studies dealing with the use of environmental interpretation (Gössling, 2018a).

Ham (1992) defines environmental interpretation as the translation of the technical language of a natural science or related area into terms and ideas that non-scientists can easily understand, delivered in a way that is entertaining and interesting for participants. According to this author, it aims to blend entertainment with the conservation of the resources of the natural environment.

Environmental interpretation can be an effective strategy for encouraging tourists to adopt behaviors that contribute to a destination’s sustainability objectives (Lee, 2009). Although the use of environmental interpretation continues to predominate in relation to protected areas and other natural areas, it is beginning to be applied in other contexts that also need to be conserved and environmentally respected (Ardoin et al., 2015; Coghlan and Kim, 2012). For example, it has been used to educate tourists on the protection of the general environment, fauna, and wildlife in zoos and

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

aquariums (Ballantyne et al., 2021; Ballantyne, Hughes, Lee, Packer and Sneddon, 2018), on a cruise expedition (Walker and Moscardo, 2014), in a coastal area rich in geological resources (Kim, 2012), in maritime settings (Ballantyne, Packer and Falk, 2011; Hofman, Walters and Hughes, 2021), in nature parks and national parks (Xu, Cui, Ballantyne and Packer, 2013; Powell et al., 2018), and in an eco-resort (Lee, Jan and Chen, 2021), among other contexts.

Environmental interpretation offers many advantages compared to other environmental sustainability strategies (Moscardo and Benckendorff, 2015). For example, while its primary purpose is to contribute to the protection of the environment by encouraging more pro-environmental behavior among visitors, it also has the capacity to improve the participants' experience, increasing their satisfaction and enjoyment (Huang, Weiler and Assaker, 2015). These factors render environmental interpretation an ideal approach for the tourism sector.

To measure the effectiveness of environmental interpretation in terms of fulfilling its purpose, scholars have turned to the Theory of Planned Behavior (Ajzen, 1985) according to which attitudes are mental dispositions to respond favorably or unfavorably to an object or event and are determined by salient beliefs about that object, as knowledge might influence these beliefs and attitudes and, in turn, intentions and behaviors (Jacobs and Harms, 2014). Based on this, attention has primarily been paid to analyzing the effects of interpretive tools on pro-environmental knowledge and attitudes (Derrien and Stokowski, 2017). Thus, the literature establishes a relationship between the three variables, such that improved knowledge of environmental conservation issues would contribute to a positive attitude toward the environment that could subsequently lead to behavior modification (Powell et al., 2018; Wang, Zhang, Yu and Hu, 2018). This link is well established in the literature (Bradley, Waliczek and Zajicek, 1999; Gao, Mattila and Lee, 2016).

However, although previous studies have shown that interpretation is a highly effective tool for enhancing tourists' environmental knowledge, pro-environmental attitudes, and environmental behaviors (Ardoin et al., 2015; Ballantyne et al., 2011; Cheung and Fok, 2014; Coghlan, Ruth Fox, Prideaux and Lück, 2011; Powell and Ham, 2008), the research results have not always been able to verify its positive impact (Ardoin et al., 2015; Lee et al. 2021). The literature indicates that this may be due to the fact that there are so many factors that can affect pro-environmental behavior (Gössling, 2018a; Wicker and Becken, (2013), which calls for a deeper understanding of the factors that may intervene in the effectiveness of this tool (Ballantyne et al., 2021; Powell et al., 2018).

Complementing prior research, this study therefore aims to specifically explore the effects of the design of environmental interpretation, on the one hand, and the characteristics of the tourist on cognitive, affective, and behavioral results, on the other. Hence, in the present study, we opted to analyze one particular characteristic of environmental interpretation—namely, the format, comparing a gamified vs. a

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

non-gamified version. This distinction is important, given that environmental interpretation needs to generate certain psychological effects in order to be impactful: participant enjoyment, autonomy, competence, and relatedness. The combined achievement of these effects is what gives rise to a so-called *gameful* experience (Houtari and Hamari, 2012, 2017). Such an environmental interpretation experiences that trigger emotions are more effective at stimulating pro-environmental intentions as it triggers emotions, as demonstrated in the studies conducted by Jacobs and Harms (2014) and Hofman et al. (2021), and/or enjoyment (Powell and Ham, 2008). In line with these previous contributions, it is of interest to investigate further the effect that a *gameful* experience may achieve among participants.

The literature points to the use of ICTs to build gamification into the design of the experience (Douglas and Brauer, 2021; Gössling, 2018b; Johnson et al., 2017; Ouariachi et al., 2020). However, the scholarship to date has not considered the use of gamification in environmental interpretation design, how to measure the participant's experience of such an approach, or how it affects tourist behavior. Existing studies touch only briefly on the inclusion of different games in the interpretation experience (Ballantyne et al., 2021) or link game literature and interpretation to theoretical frameworks on gamification (Coghlan and Carter, 2020). Furthermore, when it comes to designing effective interpretive materials, a comprehensive understanding of participants is essential, since information about the target audience needs to inform all design decisions if the interpretation is to truly connect the visitor to a given location or experience (Xu et al., 2013). In line with other research that finds that the results of environmental interpretation are influenced by various characteristics of tourists (Ballantyne et al., 2011; Ballantyne et al., 2021; Xu et al., 2013), it is therefore important to look into the psychological antecedents of the results of environmental interpretation. To approach this, we took into account how perceived psychological distance affects knowledge, attitude, and behaviors. The aim here is to contribute to a behavioral model for sustainable tourism development.

Scholars agree that psychological distance plays a significant role in individuals' evaluation and decision-making mechanisms and that it can have a major impact on their behavior (Lee et al., 2021; Trope et al., 2007). On this premise, it is also likely that the design of the environmental interpretation experience needs to be sensitive to the different perceptions of distance that tourists from different cultures and countries will bring—that is, the design needs to be adapted to fit the target audience if it is to be effective. This perspective—the impact of environmental interpretation experiences on pro-environmental consumer behavior, taking into account the psychological distance of the target audience from the destination—has not been analyzed in the literature to date.

Addressing these lacunae, the present research 1) creates a *gamified* environmental interpretation experience using ICTs to design specific features and 2) analyzes the role of psychological distance in tourists' response to the interpretation experience.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

2.2. The effect of gamified environmental interpretation on tourists

The earliest academic research to deal with the concept of gamification was published in 2011. The purely systemic perspective originally taken by scholars was later criticized by some authors for its omission of the participant experience or the *gameful* experience (Huotari and Hamari, 2017). It is now acknowledged that the experiential aspect of games—the end-user perspective—must be taken into account when measuring the effectiveness of gamification. Researchers are now also beginning to examine the effects of gamification in spheres such as sustainable tourism, where it may help to reduce the environmental harm caused by tourists to the destination, through the use of games designed to incentivize the desired environmentally-friendly behavior while, simultaneously, enhancing visitors' enjoyment of their holiday (Dolnicar, 2020).

However, how the gamification is perceived (and, therefore, its effectiveness) may be influenced by the characteristics of the participants themselves, such as age (Polo-Peña, Frías-Jamilena and Fernández-Ruano, 2020) or experience with games (Landers and Armstrong, 2017), among others. Perceptions of the gamification may also be shaped by participants' experience in the context of application (Koivisto and Hamari, 2019), in this case, the context of sustainability and, more specifically, the search for more sustainable behavior.

Although gamification has proven itself to be beneficial in different spheres (Douglas and Brauer, 2021; Gössling, 2018b; Johnson et al., 2017; Ouariachi et al., 2020), it is not without its critics. Aguiar-Castillo et al. (2018), for instance, refer to it as “gamipulation”—the manipulation of individuals into displaying pro-environmental behaviors by means of a game—and highlight its abuse of extrinsic motivators and the need for motivation to be intrinsically-driven. Indeed, this criticism and the need to address intrinsic motivations are frequently addressed by the literature (Hanus and Fox, 2015; Luo, 2021, pp. 1-25).

Intrinsic motivations are particularly important in the context of environmental interpretation. According to the model developed by Ham (1992), for such an experience to be successful, it must fulfill four key criteria: it must be enjoyable, relevant, organized, and thematic (captured in the mnemonic “EROT”). Ham (2013) subsequently modified the sequence of this model, shifting from EROT to TORE—that is, putting the theme first and then ensuring this is organized into impactful sub-themes. In this way, Ham emphasized the importance of engaging participants with a strong theme embedded within the interpretation experience, as this fosters a positive effect on positive effect on their behaviors. Gamification can make interpretation fun (Kim and Hall, 2019) and, what is more, it can also—if it generates an intrinsically-motivating experience—render it more relevant, as it will deepen the participants' commitment and make their motivation last longer (Xu et al., 2017).

While achieving a *gameful* experience is considered essential for the design and use of gamification features (Hamari, Koivisto and Sarsa, 2014), there is no consensus on

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

its dimensions, nor on how to measure it (Eppmann, Bekk and Klein, 2018; Huotari and Hamari, 2017). However, there is concordance between some authors' work on measurement scales, such as Eppman et al. (2018) and Liu, Wang, Huang and Tang (2019), who concur that a specific dimension to capture participants' enjoyment is essential. Liu et al. (2019) also note that gamification should stimulate the intrinsic motivation of participants if it is to be considered a truly *gameful* experience.

Intrinsic motivation is determined by three basic psychological needs—autonomy, competence, and relatedness—according to Self-Determination Theory, which is commonly used in gamification research (Seaborn and Fels, 2015). When these needs are satisfied, the subject's intrinsic motivation increases (Deci and Ryan, 1985). Autonomy refers to the sense of being able to choose whether or not to perform a task and to choose how to go about it (Burgers, Eden, Van Engelenburg and Buningh, 2015); competence refers to the feeling of possessing the ability to perform the task and achieve objectives (Xu et al., 2017); and relatedness refers to the desire to feel connected to other people, with a sense of recognition and acceptance (Koivisto and Hamari, 2019). Hence, participation in a gamified experience can satisfy people's basic needs when that experience is supported by a system of *affordances*—inherent motivational elements that encourage specific actions among participants.

Enjoyment, in gamification terms, is understood as spontaneity in users' interaction with the gamified system (Hamari and Koivisto, 2015a; Martocchio and Webster, 1992) and the exploratory, creative behaviors that interaction generates (Hamari and Koivisto, 2015a). Enjoyment is important not least because it helps the participant persevere with the longer-term behaviors being encouraged by the gamification experience (Wu and Liu, 2007). It also affects how consumers respond to a product innovation (Aroean, 2012) and heightens their interest in making discoveries and exploring new concepts or products (Hoffman and Novak, 1996).

In short, participation in well-designed gamification has been found to generate a *gameful* (motivating and enjoyable) experience (Huotari and Hamari, 2017). The positive effects of gamification on environmental sustainability have been proven in terms of the adoption of pro-environmental behaviors (Douglas and Brauer, 2021; Gössling, 2018b; Johnson et al., 2017; Ouariachi, Li and Elving, 2020). In the sustainable tourism realm, there are studies analyzing the techniques and applications that are most relevant when gamification is used to address a conservation problem in destinations specializing in sustainable tourism (e.g. Souza, Marques and Veríssimo, 2020). However, in the gamification literature, no studies to date have applied gamification to tourist environmental interpretation in tourist destinations, captured the participant's perspective when measuring the *gameful* experience, or provided empirical evidence of the possible superior effect of a *gamified* tourist environmental interpretation experience vs. a non-gamified version on the variables pro-environmental knowledge, attitude, and behavior, all of which are essential in achieving environmental sustainability.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

In short, gamification can make environmental interpretation more effective, especially if it follows the EROT and TORE frameworks developed by Ham (1992, 2013) which will help generate the psychological outcomes of enjoyment, autonomy, competence, and relatedness. Studying a gamified environmental interpretation from this perspective will enable us to contribute to the literature and advance the understanding of the factors that affect the results of environmental interpretation in terms of the participants' pro-environmental knowledge, attitude, and behavior (Ballantyne et al., 2021; Powell et al., 2018).

In light of the present literature review, a gamified environmental interpretation experience is expected to achieve superior results in terms of these three variables compared to a non-gamified experience. The following hypothesis is therefore proposed:

H1. The effects of environmental interpretation, when gamified, on (a) pro-environmental knowledge, (b) pro-environmental attitude, and (c) pro-environmental behavior are significantly more positive than when it is non-gamified.

2.3. The effect of the tourist's psychological distance

The notion of 'psychological distance' was first used by Lewin (1951) (cited in Van Boven, Kane, McGraw and Dale, 2010). It has been defined as the "subjective experience that something is close or far away from the self, here, and now" (Trope and Liberman, 2010). Psychological distance is determined by a person's perception of how near or distant a given stimulus—object, place, or event—is from their direct experience. It takes into account temporal distance (*when* that stimulus presents itself), spatial distance (*where* it presents itself), social distance (in relation to *whom* it presents itself), and hypothetical distance (the probability that it *will* present itself).

Even if the stimulus conveys equivalent information to different people, individuals will represent it as psychologically near or distant, depending on the perceived distance from their personal experience (Miao and Mattila, 2013). At the same time, according to Trope and Liberman (2010), the aforementioned dimensions of psychological distance—spatial, temporal, social, and hypothetical—are interrelated, such that whatever influences one dimension can also influence the rest (Bar-Anan, Liberman, Trope and Algom, 2007; Stephan, Liberman and Trope, 2010).

The main theoretical basis for the concept of psychological distance is construal level theory, which positions psychological distance as being related to the construction of mental conceptualizations of perceived reality (Liberman and Trope, 2014; Trope, Ledgerwood, Liberman and Fujita, 2021). Depending on how the individual perceives the stimulus, it will seem safe or uncertain, familiar or strange, similar or different—that is, near or distant. And this psychological distance will significantly influence their decisions and behaviors (Lee et al., 2021).

Previous research indicates that a close psychological distance improves attitude toward environmental issues (Carmi and Kimhi, 2015; Cheng, Ao, Mao and Xu, 2021;

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

Jones et al., 2017) as well as pro-environmental behavioral intention (Carmi and Kimhi, 2015; Jones et al., 2017; Schill and Shaw, 2016). Psychological distance has been identified as a key factor in purchase decision-making relating to environmentally-friendly products (Chang et al, 2015), perceived risk of climate change (Jones et al., 2017), and perception of environmental threats (Carmi and Kimhi, 2015), among other related issues. Against this backdrop, and considering that one of the foundational principles of interpretation is that it should be tailored to meet different participant profiles (Ballantyne et al., 2021), we expect the effect of an environmental interpretation strategy on pro-environmental knowledge, attitude, and behavior to differ, depending on the psychological distance of the destination (the stimulus), as perceived by the consumer. The following hypothesis is therefore proposed:

H2. Consumers for whom the stimulus is psychologically near will achieve significantly greater (a) pro-environmental knowledge, (b) pro-environmental attitude, and (c) pro-environmental behavior than those for whom it is psychologically distant.

2.4. The moderating effect of psychological distance on the effectiveness of gamified environmental interpretation among tourists

When a good match is achieved between the stimulus and the individual's mindset, this increases the positive effects of environmental interpretation on the adoption of pro-environmental behaviors (Chou and Lien, 2012; Grazzini, Rodrigo, Aiello and Vigilia 2018; Jin and He, 2013; Lee and Oh, 2014). One way to achieve this match is through 'regulatory construal fit', which involves creating a good fit between the individual's regulatory focus and the level at which they construe information (Lee, Keller and Sternthal, 2010).

According to regulatory focus theory (Higgins, 1997), people will act in pursuit of a goal from one of two focuses, promotion vs. prevention, with each focus being driven by distinct underlying concerns. People with a promotion focus tend to be concerned with progress, growth, and achievements (gains) in the quest to reach their goals, while those with a prevention focus are more concerned with their protection, their safety, and their responsibilities (the avoidance of losses) (Higgins et al., 2001).

Returning to construal level theory, a low-level construal is activated when the stimulus is psychologically near; and, conversely, a high-level construal is activated when it is psychologically distant and thus demanding of a greater cognitive effort (Trope and Liberman, 2010). The different levels are determined by various characteristics (Trope et al., 2021). Individuals for whom the stimulus is psychologically near construe it in a specific, detailed, and subordinate way (a low-level construal), while those for whom it is psychologically distant will construe it in abstract, general, and superordinate terms (a high-level construal) (Kim, Kim, Kim and Magnini, 2016; Shin, Chung, Kang and Koo, 2016; Tan, 2018).

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

On this premise, regulatory construal fit can be achieved (Lee et al., 2010) when a promotion focus is matched by a high-level construal or a stimulus that is psychologically distant, or when a prevention focus meets a low-level construal or a perception of psychological proximity. There are many studies exploring the connection between construal level theory and regulatory focus theory (Chou and Lien, 2012; Lee and Higgins, 2009; Lee and Oh, 2014; Lerner, Streicher, Sachs, Raue and Frey, 2015). These works link regulatory focus to the construal level, taking into account the characteristics of the stimuli to which people are exposed. Individuals with a promotion focus will endeavor to ensure success and will mentally construct their goals in an abstract way and in global terms, while those with a prevention focus will seek to avoid setbacks and will represent their goals in specific and localized terms (Aaker and Lee, 2006; Lee and Higgins, 2009). Furthermore, the promotion focus is associated with an ideal vision of oneself (desirability and high-level construal) while the prevention focus is associated with a personal sense of duty or obligation (convenience or feasibility and low-level construal) (Liberman and Trope, 1998).

Regarding the characteristics of the regulatory focus, an environmental interpretation experience with a non-gamified design can be more strongly associated with the 'prevention' focus because such experiences primarily emphasize the costs, losses, or detrimental consequences of failing to take (pro-environmental) action as well as participant safety (Coghlan et al., 2011; Roberts et al., 2014; Tan and Law, 2016). By contrast, a gamified environmental interpretation experience can be more strongly associated with the 'promotion' focus because the reward system inherent in gamification motivates participants to strive toward recompense for the progress they make (Lee and Higgins, 2009). Therefore, it may be that a good regulatory construal fit is achieved among those individuals for whom the destination is psychologically near and who are exposed to a non-gamified version of the environmental interpretation experience and among those for whom it is psychologically distant and who are exposed to a gamified version.

In view of these postulations, it is of value to *jointly* analyze the effect of the design type of the environmental interpretation experience (gamified vs. non-gamified) and of the participant characteristics in terms of their psychological distance from the destination (near vs. distant). A joint examination of the two factors would indicate whether it is possible to achieve a good regulatory construal fit between them. On the basis of this finding, we expect that, if there is a regulatory construal fit between the design type (gamified vs. non-gamified) and the psychological distance of the individual relative to the destination (near vs. distant), this will exert a positive effect on pro-environmental knowledge, attitude, and behavior. An environmental interpretation experience with a gamified design is expected to achieve regulatory construal fit among tourists for whom the destination (stimulus) is psychologically distant. The following hypotheses are therefore proposed:

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

H3. Psychological distance moderates the effect of environmental interpretation type on pro-environmental knowledge.

H3a. When the stimulus is psychologically distant, the effect on pro-environmental knowledge is greater in the case of a gamified environmental interpretation experience than a non-gamified version.

H4. Psychological distance moderates the effect of environmental interpretation type on pro-environmental attitude.

H4a. When the stimulus is psychologically distant, the effect on pro-environmental attitude is greater in the case of a gamified environmental interpretation experience than a non-gamified version.

H5. Psychological distance moderates the effect of environmental interpretation type on pro-environmental behavior.

H5a. When the stimulus is psychologically distant, the effect on pro-environmental behavior is greater in the case of a gamified environmental interpretation experience than a non-gamified version.

However, when the stimulus is psychologically near, the information and characteristics conveyed by a gamified environmental interpretation experience are fundamentally the same as in any other environmental interpretation. This is because the gamification provides important features that participants who perceive a lesser distance from the stimulus—those with a prevention-focused regulatory orientation—most desire. This is because the gamified design shows them how to fulfill their obligations and emphasizes safety. Equally, the gamified design is also valued by users who present a greater psychological distance—those who are promotion-focused—because participation enables them to fulfill their ideals and emphasizes the quest to achieve certain goals. According to Huotari and Hamari (2012, 2017), a gamified offer comprises a core service plus an enhanced service incorporating *affordances* that deliver a *gameful* experience. As the enhanced service supports the core service—not vice-versa—the effect on participants for whom the stimulus is psychologically near will not be affected by the environmental interpretation type (gamified vs. non-gamified) to which they are exposed. Therefore, the following hypotheses are proposed:

H3b. When the stimulus is psychologically near, the effect on pro-environmental knowledge will not be affected by environmental interpretation type.

H4b. When the stimulus is psychologically near, the effect on pro-environmental attitude will not be affected by environmental interpretation type.

H5b. When the stimulus is psychologically near, the effect on pro-environmental behavior will not be affected by environmental interpretation type.

3. Methodology

3.1. Sample and procedure

Spain was selected as the basis of the sample because there are several issues that put the sustainability of the Spanish tourism sector—and its profitability—at risk in the long term (Ministry of Industry, Commerce and Tourism, 2019). It is also one of the destinations most vulnerable to climate change (Scott et al., 2019). These challenges are set against a backdrop of Spain's traditional international popularity as a destination (UNWTO, 2020a, b).

Regarding the sample subjects, first, they had to fulfill two basic criteria to be able to participate in the experiment: to be of legal age and to have never visited Spain before (to ensure there was no possible effect of past experience of the destination on the dependent variable). As the United Kingdom and the United States (US) are representative nationalities for Spain (INE, 2020), the present sample population comprised British and US tourists who were potential first-time visitors to Spain. In line with other studies that deal with more than one nationality, the chosen study population comprised British and American tourists who were potential first-time visitors to Spain (Pike, Pontes, and Kotsi, 2021). Their shared language, English, was the language used in the quasi-experiment (both gamified and non-gamified versions of the environmental interpretation). In terms of building the sample, an external research company was used to recruit the Internet users and ensure sample representativeness for the study.

Potential participants were contacted by email. Those who chose to click on the URL contained in the message were redirected to a secure site where the questionnaires and the experimental stimulus were hosted. The survey procedure comprised three stages. Stage 1: participants were presented with an initial questionnaire relating to their prior image of Spain, their self-perceived level of environmental concern, and subjective norms. Stage 2: each person was randomly assigned to one of the two treatments (gamified vs. non-gamified multimedia environmental interpretation experience). Stage 3: the participants were exposed to the relevant stimulus, and the minimal exposure time in both treatments was controlled. Finally, in stage 4, they responded to the second questionnaire, which covered the dependent variables, manipulation checks, psychological distance, and socio-demographic variables (gender, age, and employment status).

The fieldwork was conducted in June 2018. The final sample comprised 314 valid subjects; the control group comprised 156 subjects (exposed to the non-gamified version), and the experimental group comprised 158 subjects (exposed to the gamified version). The demographic profile of the sample and the sample distribution were therefore largely aligned with the general profile of British and US tourists (IndexMundi, 2019; Koema, 2018) (see Table 1).

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

Table 1. Socio-demographic profile of the final sample

	Non-gamified version	Gamified version	n (%)
Valid subjects	156	158	314
Female	93	91	184 (59%)
Male	63	67	130 (41%)
18–29 years old	25	28	53 (17%)
30–44 years old	34	40	74 (24%)
45–65 years old	61	60	121 (38%)
>65 years old	36	30	66 (21%)
In employment	89	88	177 (57%)
Not in employment	67	70	137 (43%)

3.2. Quasi-experimental design

The quasi-experiment involved a control group and a post-test measure (Zikmund, 1998). The design was based on one treatment variable (environmental interpretation type), three dependent variables (pro-environmental learning, attitude, and behavior), and one moderating variable (psychological distance). Quasi-experimental designs offer external validity, meaning that the variables can be manipulated in natural settings where this would otherwise be virtually impossible (Zikmund, 1998). Despite their advantages, quasi-experimental designs also present certain limitations. For example, they are more vulnerable to selection biases—that is, the treatment group may differ from the control group in characteristics that are correlated with the results under study, thereby distorting the impact results; and they can also produce some difficulties in terms of how to rule out variables other than the independent variables as explanations for the evidence produced. Every effort was made to overcome this challenge for all the differences observed (see control variables listed in section 3.2.2).

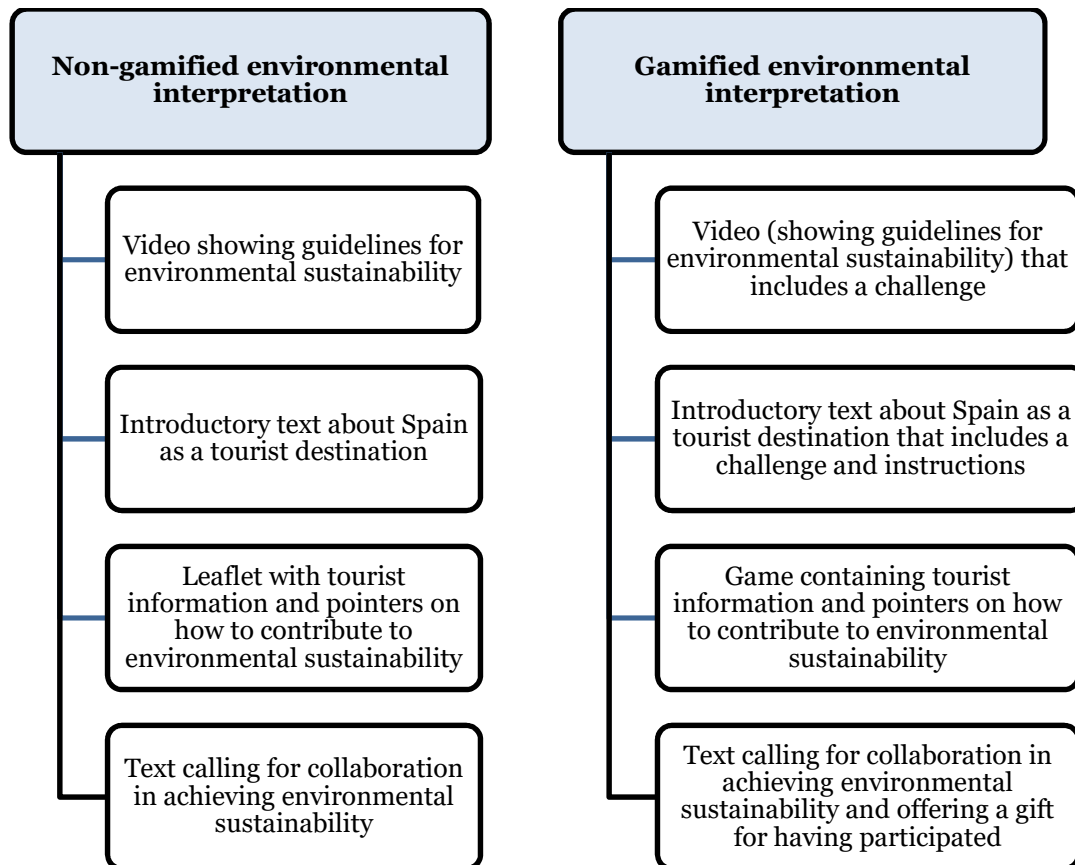
3.2.1. *Independent variables*

Environmental interpretation type. Two alternative environmental interpretation experiences needed to be created: non-gamified (multimedia format only) vs. gamified (multimedia gamification format designed to generate a *gameful* experience) (Appendix 1). The two versions provided an equivalent *core*

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

environmental interpretation service and shared homogeneous information, word-count, and images (Fig. 1), only differing in their respective design features.

Figure 1. Structure of non-gamified vs. gamified environmental interpretation experience



The format selected for the non-gamified version was a multimedia tourism leaflet. This was divided into three sections, one for each of three types of tourism (‘Beaches’, ‘Historical & Cultural Heritage’, and ‘Natural Resources’). The format for the gamified version was, logically, more interactive. First, participants could select from a menu of avatars to represent them in the game. Next, they were presented with an interactive map of Spain featuring icons representing the aforementioned three types of tourism, and they were able to select the order in which they clicked on the three scenarios to access the information therein. To challenge them to reflect on the content they had just read, they were presented with three questions and were awarded 5 points for every correct answer (winning up to a maximum of 15 points per tourism type and 45 for the whole game). The minimum exposure time for both treatments, including video, was 4 minutes 8 seconds.

Psychological distance. This variable was measured using a survey, which the literature has acknowledged as a valid means to capture motivations and perceptions (Hernández-Ortega, 2018) when such factors (psychological distance, in this case) are not directly observable. All three dimensions—spatial, social, and temporal distance—were measured on a 2-item, 7-point Likert scale (Appendix 2), as previously used by

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

other authors (Chang et al., 2015). The scale presented adequate reliability and validity (Table 2), which meant that the mean value of the items could be used. The median was then used as a reference to divide the sample into two groups: one for those participants with a value lower than the median (lesser psychological distance) and one for those presenting a higher value (greater psychological distance). The final split of the resulting four groups was as follows: Non-gamified environmental interpretation—psychologically near; Non-gamified environmental interpretation—psychologically distant; Gamified environmental interpretation—psychologically near; and Gamified environmental interpretation—psychologically distant.

Table 2. Composite Reliability and Average Variance Extracted of the measurement scales.

Variable	Gamified version	n (%)
Prior destination image	0.97	0.89
Environmental concern	0.94	0.74
Subjective norms	0.93	0.78
Autonomy	0.93	0.82
Competence	0.95	0.78
Relatedness	0.93	0.82
Enjoyment	0.95	0.84
Pro-environmental learning	0.96	0.89
Pro-environmental attitude	0.95	0.82
Pro-environmental behavior	0.91	0.77
Goodness-of-fit of the model: Global fit of the model: Normed chi-square=2.12, RMSEA=0.08; Incremental fit: CFI=0.90, IFI=0.90, TLI=0.90		

3.2.2. Dependent variable and other variables

The literature review identified that there are measurement scales previously validated by other studies that were appropriate for this context of application. The scales in question were therefore examined to corroborate their suitability and, if necessary, adapt their phrasing (Appendix 2). In all cases, a 7-point Likert scale was used, with the exception of ‘prior destination image’, for which a 7-point semantic differential scale was selected.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

Dependent variables. The dependent variables were pro-environmental knowledge, attitude, and behavior (Appendix 2). For pro-environmental learning, a scale developed by Hamari et al. (2016) was used to measure the learning acquired as a result of the interpretation experience, according to the participant's subjective perception. Pro-environmental attitude was measured on a 7-point scale previously used by Ballantyne et al. (2011). Finally, pro-environmental behavior was measured on the scale developed by Cheung and Fok (2014), which indicates pro-environmental behavioral intention and thus provides an immediate gauge of the effects of the environmental interpretation experience.

Experimental manipulation check. To make sure that the factor manipulation had been correctly performed and test that the gamified environmental interpretation had, indeed, delivered a *gameful* experience (Perdue and Summers, 1986), a scale was validated to measure this construct that covered both intrinsic motivation and enjoyment. For intrinsic motivation, the scales employed by Lieberoth (2015) were used to measure three dimensions: autonomy, competence, and relatedness. To measure enjoyment, the scale developed by Van der Heijden (2004) and later used by Hamari and Koivisto (2015a) was applied (see Appendix 2).

Control variables. The control variables 'prior destination image', 'environmental concern', and 'subjective norms' (Malhotra, 2010) were used to link the factors manipulated in the experiment to the dependent variable. The three control variables were measured prior to participant exposure to the treatments, as recommended (Keppel, 1991; Kirk, 1995; Perdue and Summers, 1986). Prior destination image was measured using an approach similar to that of other studies (Beerli and Martín, 2004; Frías-Jamilena, Rodríguez-Molina and Castañeda-García, 2008). To measure participants' environmental concern, a scale previously applied by other authors (Chang et al., 2015) was used. Finally, subjective norms were measured based on the approach taken in previous studies (Hamari and Koivisto, 2015b) (see Appendix 2).

Socio-demographic variables. The socio-demographic variables included in the questionnaire covered gender, age, and employment status, among other factors. Four age intervals and two categories were created to capture employment status: in employment and not in employment.

4. Results analysis

To test our proposed hypotheses, we conducted a variance analysis (ANOVA) using SPSS V.25 software. In this analysis, pro-environmental learning, attitude, and behavior were the dependent variables, and 'environmental interpretation type' and 'psychological distance' the independent variables. Prior to this, however, we had to check the validity and reliability of the scales and verify that there was no selection bias in the sample.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

4.1. Scale reliability

Given that the scales used in the present research presented an acceptable degree of reliability and validity (see Table 2), it was decided that the value of each of these variables could be calculated on the basis of the sum value of its items (Hair, Black, Babin and Anderson, 2009, pp.126–7).

4.2. Sample selection bias

In quasi-experiments, subjects are not randomly assigned to groups, hence it is essential to ensure that there is no selection bias present (D'Agostino, 1998). To check this, we analyzed association using a set of covariates that, according to the literature, affect environmental interpretation: gender (Ballantyne et al., 2011; Kim, 2012), age (Ballantyne et al., 2011; Kim, 2012), and employment status (Cheung and Fok, 2014). Having performed association tests for the different groups and the covariates (age: $\chi^2=7.977$; $df=9$; $p\text{-value}=0.536$; employment: $\chi^2=12.038$; $df=18$; $p\text{-value}=0.845$; gender: $\chi^2=0.229$; $df=3$; $p\text{-value}=0.973$), we found no evidence of a significant level being reached and, thus, the absence of subject selection bias was confirmed. Further verifying the results with other, more complex, techniques (Rosenbaum and Rubin, 1984; Zanutto, Lu and Hornik, 2005) was therefore deemed unnecessary.

4.3. Manipulation check

To check that the manipulated factor produced the desired effects, we performed an ANOVA to compare the means for that factor. The mean differences for *gameful* experience were significant ($M_{\text{gamified}}=5.01$; $M_{\text{non-gamified}}=4.73$; $p\text{-value} \leq 0.05$).

4.4. Concomitant variables

The effect of the factors on the dependent variable was controlled via the covariates 'prior destination image', 'environmental concern', and 'subjective norms'. The use of covariates is justified if 1) they are related to the dependent variable and 2) they are not related to the independent variables (Kirk, 1995). To verify the first criterion, we calculated the Pearson correlation between each of the three aforementioned variables and the dependent variables (pro-environmental learning, attitude, and behavior). There was a significant correlation in all cases—pro-environmental learning ($r_{\text{image}}=0.396$, $p\text{-value} \leq 0.01$; $r_{\text{environmental concern}}=0.296$, $p\text{-value} \leq 0.01$; and $r_{\text{subjective norms}}=0.380$, $p\text{-value} \leq 0.01$), pro-environmental attitude ($r_{\text{image}}=0.359$, $p\text{-value} \leq 0.01$; $r_{\text{environmental concern}}=0.270$, $p\text{-value} \leq 0.01$; and $r_{\text{subjective norms}}=0.305$, $p\text{-value} \leq 0.01$), and pro-environmental behavior ($r_{\text{image}}=0.385$, $p\text{-value} \leq 0.01$; $r_{\text{environmental concern}}=0.278$, $p\text{-value} \leq 0.01$; and $r_{\text{subjective norms}}=0.275$, $p\text{-value} \leq 0.01$). All the covariates therefore met the first criterion.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

To check the second criterion, we performed an ANOVA for each covariate, using the covariate as the dependent variable and the four different groups as the independent variables, thus: Non-gamified—psychologically near; Non-gamified—psychologically distant; Gamified—psychologically near; and Gamified—psychologically distant. For all three covariates, the results showed a significant relationship between the groups and the covariate (prior image: $F=8.85$, $p\text{-value} \leq 0.00$; environmental concern: $F=8.43$, $p\text{-value} \leq 0.00$; subjective norms: $F=4.75$, $p\text{-value} \leq 0.00$). The second requirement for being included as covariates was therefore not met.

4.5. Testing the hypotheses

In light of these results, we tested our hypotheses using an ANOVA, in which pro-environmental learning, attitude, and behavior were the dependent variables and ‘environmental interpretation type’ and ‘psychological distance’ were independent variables.

The main effect of environmental interpretation type on pro-environmental learning, attitude, and behavior (H1a, H1b, and H1c) was significant, the mean for the gamified environmental interpretation experience being greater than for the non-gamified version in all cases (Table 3). For pro-environmental learning, the gamified mean was higher (non-gamified $M.=4.93$ vs. gamified $M.=5.34$) and the difference between the two was significant ($F=5.90$, $p\text{-value} \leq 0.01$). For pro-environmental attitude, the gamified mean was also higher (non-gamified $M.=4.51$ vs. gamified $M.=5.00$) and, again, the difference was significant ($F=8.56$, $p\text{-value} \leq 0.01$). Finally, the gamified mean was higher for pro-environmental behavior (non-gamified $M.=4.18$ vs. gamified $M.=4.62$), the difference between both means being significant once again ($F=6.83$, $p\text{-value} \leq 0.01$). Therefore, there is empirical support for H1a, H1b, and H1c.

Table 3. ANOVA analysis results for Hypotheses 1 and 2

H	Dependent variable	Sum of squares	Degrees of freedom	Mean squares	F	p-value	Hypothesis: empirical support?
Environmental interpretation type							
H1a	Pro-environmental learning	13.2	1	13.2	5.90	0.01	Yes
H1b	Pro-environmental attitude	18.92	1	18.92	8.56	0.00	Yes

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

H1c	Pro-environmental behavior	15.46	1	15.46	6.83	0.00	Yes
Psychological distance							
H2a	Pro-environmental learning	122.66	1	122.66	65.04	0.00	Yes
H2b	Pro-environmental attitude	131.74	1	131.74	71.33	0.00	Yes
H2c	Pro-environmental behavior	95.97	1	95.97	47.86	0.00	Yes

The main effect of psychological distance on the dependent variables (H2a, H2b, and H2c) was also significant, with the mean of psychological nearness being greater than that of psychological distance (Table 3). Individuals for whom the stimulus was psychologically near presented higher values for pro-environmental learning (M_near: 5.80; M_distant: 4.55), attitude (M_near: 5.44; M_distant: 4.14), and behavior (M_near: 4.99; M_distant: 3.88), the difference between the two means being significant for pro-environmental learning ($F=65.04$, $p\text{-value} \leq 0.01$), attitude ($F=71.33$, $p\text{-value} \leq 0.01$), and behavior ($F=47.86$, $p\text{-value} \leq 0.01$). Therefore, H2a, H2b, and H2c also obtain empirical support.

Finally, when interpreting the main effects, it is important to note that the interaction between environmental interpretation type and psychological distance is significant (Table 4). As proposed in H4 and H5, the participant's psychological distance moderates the effect of environmental interpretation type on attitude and pro-environmental behavior ($p\text{-value} \leq 0.01$). In contrast, for pro-environmental learning, the interaction effect was not significant ($p\text{-value} = 0.20$), hence H3 received no empirical support. However, according to Wilcox (1987), it is helpful to perform the multiple-comparisons test to determine the differences between-groups that are undetectable with the F test. We conducted Tukey's test for this purpose, and the results indicated that pro-environmental learning was significantly higher among individuals for whom there was greater psychological distance when exposed to a gamified environmental interpretation vs. a non-gamified environmental interpretation ($p\text{-value} \leq 0.05$), thus providing empirical support for H3a. The same was true in the case of pro-environmental attitude and behavior ($p\text{-value} \leq 0.01$), confirming H4a and H5a. However, in this case, the result of Tukey's test indicated that, when there is psychological nearness, a gamified environmental interpretation experience does not generate any significant differences in either learning ($p\text{-value} =$

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

0.91), attitude (p-value = 0.99), or behavior (p-value = 0.97) compared to a non-gamified version. This finding lends support to H3b, H4b, and H5b (Figures 2, 3, and 4).

Table 4. ANOVA analysis results for Hypotheses 3, 4, and 5

Interpretation type x psychological distance							
H	Dependent variable	Sum of squares	Degrees of freedom	Mean squares	F	p-value	Hypothesis: empirical support?
H3	Pro-environmental learning	2.98	1	2.98	1.60	0.20	Yes
H4	Pro-environmental attitude	10.14	1	10.14	5.70	0.01	Yes
H5	Pro-environmental behavior	16.89	1	16.89	8.78	0.00	Yes

Figure 2. Interaction effect of environmental interpretation design type and psychological distance on pro-environmental learning

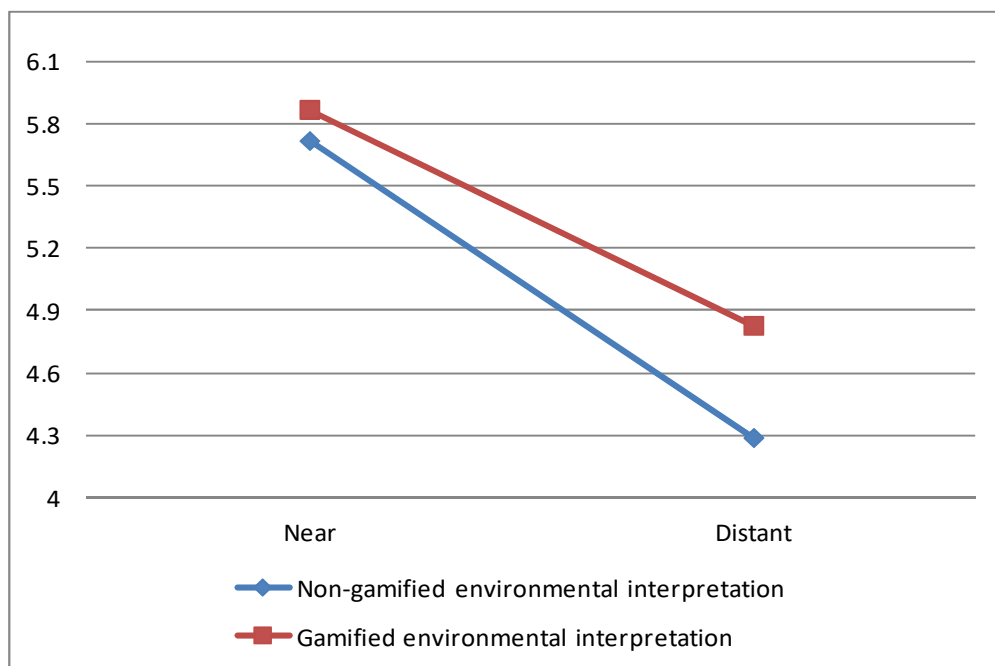


Figure 3. Interaction effect of environmental interpretation design type and psychological distance on pro-environmental attitude

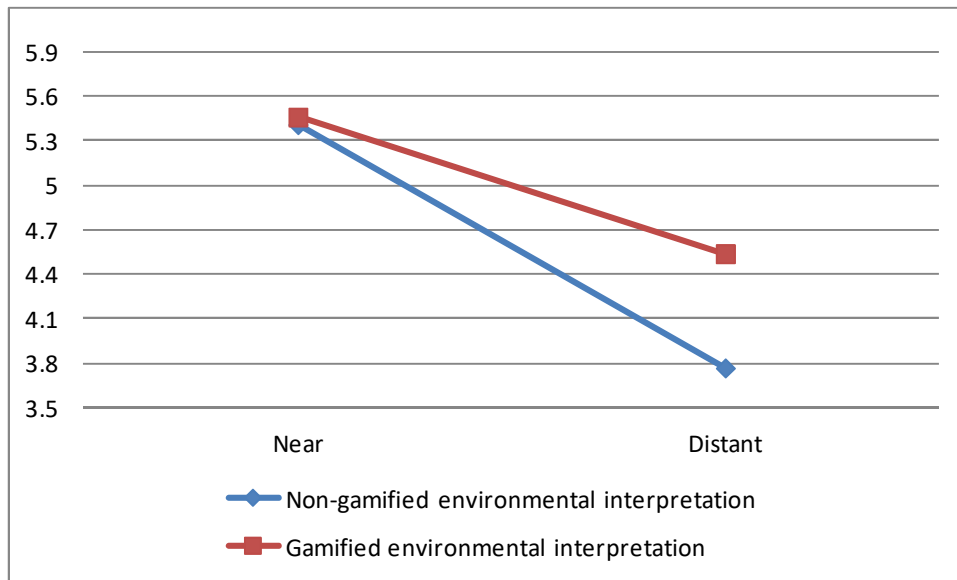
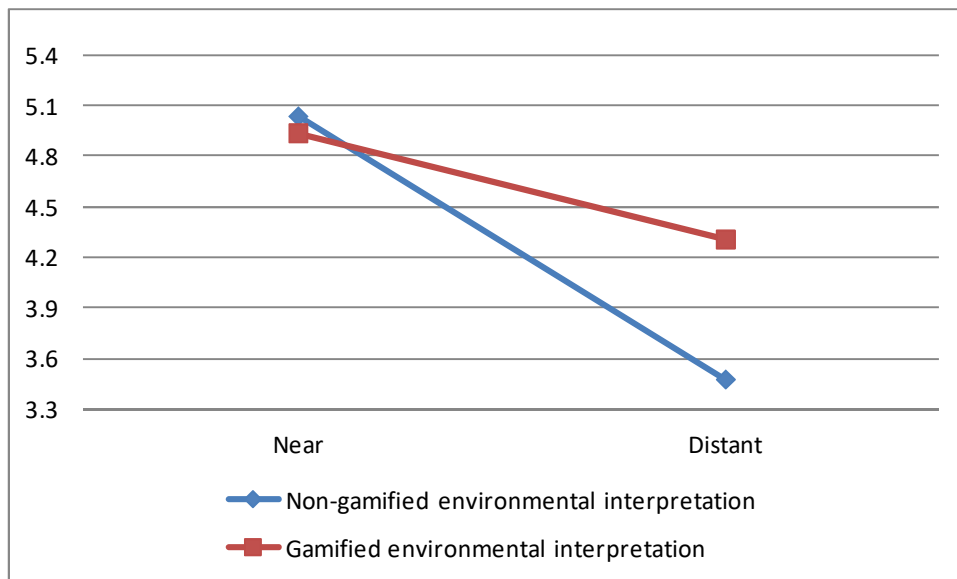


Figure. 4. Interaction effect of environmental interpretation design type and psychological distance on pro-environmental behavior



Prior to performing the ANOVA, we ensured that the three fundamental conditions of independence, normality, and homoscedasticity were fulfilled (Ordaz, Melgar and Rubio, 2014). Independence was fulfilled as this was an inter-subject study; according to authors include Uriel (1995) and Hair et al. (2009), the F statistic would not be affected by a lack of normality in samples of a size similar to that of the present study (314 individuals); and homoscedasticity posed no issue, since the groups were approximately the same size (Uriel, 1995).

5. Discussion of results and conclusions

On the basis that the main objective of tourism managers is to maximize the competitiveness of their destinations, environmental sustainability is a key factor (Pulido-Fernández et al., 2019), not least because it is essential for the development of long-term tourism activity (Scott et al. 2019). Furthermore, tourists harm the environment in many different ways (Dolnicar, 2020; Gössling and Peeters, 2015; Juvan and Dolnicar, 2017), even to the extent that they may lead the local population to reject tourism activity altogether (Gössling, McCabe and Chen, 2020). Given the importance of sustainability for the maintenance of tourism activity over the long term, it is equally essential that destinations position sustainability at the center of their strategic focus as a means to achieve greater competitiveness (Gössling et al., 2020; Koens et al., 2020). The objective of this research was therefore to contribute to the literature by providing insights into whether the use of environmental interpretation implemented via ICTs and incorporating a gamified design may constitute an appropriate strategy for achieving improved results in terms of tourist pro-environmental knowledge, attitude, and behavior—all of which are key variables for the environmental sustainability of tourist destinations. The work also sought to determine whether this effect may be moderated by the psychological distance of the tourist.

First, our results indicate that 1) environmental interpretation design type exerts a significant effect on pro-environmental learning, attitude, and behavior (as also found in previous studies). That is, the format of the interpretation experience influences the outcomes of that experience (Ardoin et al., 2015); and 2) gamified environmental interpretation yields better results than the non-gamified version in terms of pro-environmental knowledge, attitude, and behavior. This finding is consistent with other studies that demonstrated the positive effect of gamification on pro-environmental behaviors such as recycling, using methods of transport that generate less pollution, and so on (Douglas and Brauer, 2021; Gössling, 2018b; Johnson et al., 2017; Ouariachi et al., 2020). The present results therefore constitute an advancement on the extant literature dealing with the promotion of sustainable tourism in destinations. The results also illuminate gamification from the participant's perspective via the measurement of the *gameful* experience and its effectiveness in achieving variables that are critical for achieving environmental sustainability of the tourist destination: pro-environmental learning, attitude, and behavior.

Moreover, the emotional link between gamification and tourists has been demonstrated through their *gameful* experience or, more specifically, through enjoyment and intrinsic motivations. Enjoyment is an emotional outcome of gamification (Koivisto and Hamari, 2019; Sigala, 2015), and numerous studies demonstrate the importance of emotions in the impact of environmental interpretation (Jacobs and Harms, 2014; Ballantyne et al., 2011; Hofman et al., 2021).

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

Given that intrinsic motivation comes from within—when an individual performs an activity for the mere satisfaction of performing the activity itself, and there are no external forces affecting their volition—intrinsically-motivated behaviors tend to lead to deep commitment (Hamari and Koivisto, 2015a; Xu et al, 2017). If gamification is successful in eliciting intrinsic motivations, then, pro-environmental behavior will be lasting and will not diminish even in the absence of external stimuli such as fines, rewards, or legal regulations.

Second, the results show that tourists for whom the destination is psychologically distant present inferior results in terms of pro-environmental learning, attitude, and behavior. For this tourist profile, the environmental interpretation experience will be less effective, regardless of design type. These results are in line with those obtained in previous studies that indicate that, in the case of low psychological distance, individuals will adopt a more pro-environmental attitude that will translate into more environmentally-proactive behavior; and, conversely, when there is greater psychological distance, they will consider environmental problems to affect other people or places, or will believe they represent only a remote, future risk (Cheng et al., 2021; Jones et al., 2017; Schill and Shaw, 2016). These results indicate the need to search for more effective strategies, particularly for tourists who present significant psychological distance.

Finally, our results confirm that psychological distance exerts a moderating effect on the relationship between gamification and pro-environmental learning, attitude, and behavior. When the individual presents a greater psychological distance, a gamified environmental interpretation experience generates a markedly greater effect on pro-environmental learning, attitude, and behavior than the non-gamified version. However, when they present psychological nearness, there are no significant differences between the gamified and non-gamified versions in terms of their respective effects on pro-environmental learning, attitude, and behavior. This may be explained by the fact that both types of environmental interpretation provide the same core service (Huotari and Hamari, 2012). This finding confirms the existence of a regulatory construal fit, and we therefore recommend gamification as an effective strategy for targeting tourists for whom the destination is psychologically distant. This is particularly relevant considering that this collective presented inferior results in pro-environmental learning, attitude, and behavior. Our findings also demonstrate the effectiveness of gamification for both tourist profiles (psychologically near vs. distant). These insights add a valuable dimension to the many extant studies that show the importance of a fit between the stimulus and the individual's mindset (Avnet and Higgins, 2006; Cesario, Higgins and Scholer, 2008; Chou and Lien, 2012; Grazzini, Rodrigo, Aiello and Viglia, 2018).

Furthermore, our findings are relevant to the scholarship on gamification, psychological distance, and the possibilities of regulatory construal fit, as our study jointly analyzes the potential of a fit between the factors that shape the environmental interpretation experience (gamified vs. non-gamified) and those affecting the

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

participants (psychologically near vs. distant). This analysis compares a gamified environmental interpretation experience (promotion focus and high construal level) with a non-gamified version (prevention focus and low construal level). Evaluating both scenarios, we achieved a regulatory construal fit that generated superior results for the environmental interpretation experience in terms of its impact on pro-environmental learning, attitude, and behavior. Although other authors have underscored that the effectiveness of one type of interpretation vs. another may be determined by the characteristics of participants, no study, to date, has jointly analyzed the factors that influence the interpretation experience itself (gamified vs. non-gamified) together with those that affect the participants (psychologically near vs. distant) and the potential fit between them.

5.1. Practical implications, limitations, and potential future research directions

From the practical perspective, the present results have several implications for both public entities and private firms operating in the tourism sector. The question of how to improve destination sustainability is now a matter of urgency on a worldwide scale (e.g., European Union, 2021; UNWTO, 2020). This issue is not only relevant in terms of the continued conservation of the natural environment at tourist destinations, but is also essential for destinations to retain their appeal and their ability to attract tourists over the medium–long term.

As one of the fundamental pillars on which destination sustainability rests is tourist behavior (Pulido-Fernández et al., 2019), it is important to identify interventions that can generate positive behavioral change and encourage more pro-environmental conduct at the destination. To do this, those responsible for operations in the sector (such as DMOs and managers of private service-providers) must have effective strategies at their disposal that promote pro-environmental behavior among tourists and, at the same time, are well-suited to the characteristics of the sector and its different publics. The study shows that an environmental interpretation experience delivered via gamified online media may be one such highly effective strategy for increasing the pro-environmental knowledge, attitudes, and behaviors of potential tourists, which will ultimately translate into the improved environmental conservation of the destination.

Environmental interpretation is a strategy that has been harnessed by destinations and firms in the sector for several years, using traditional media. While tour guides play the role of information-source for tourists, as a mediator between tourists and local settings (Gao, Scott, and Ding, 2016), environmental interpretation is known to achieve better results when visitors are able to interact with tour guides (Ballantyne, Packer and Hughes, 2009; Coghlan and Kim, 2012; Coghlan et al., 2011; Xu et al., 2013). The results of the present study indicate that it is advisable for the sector to use gamification via online media as an even more appealing and novel strategy for implementing environmental interpretation. Gamification enables tourists to explore the destination via an innovative, interactive, and personalized format (Xu et al.,

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

2017). And it makes an even greater impact in the online environment (Hsu, Chen, Yang and Lin, 2017), which can help mitigate the absence of the human tour-guides who have always traditionally delivered environmental interpretation (Kim and Hall, 2019). While implementing gamified environmental interpretation is *especially* effective among tourists who perceive the destination to be distant, it is, overall, a highly beneficial and recommendable strategy.

This study also provides key design pointers for gamified environmental interpretation in online media. Destinations, institutions, and firms linked to the sector need to be mindful that gamification should not be approached as a set of mere game-like elements or systemic design features alone (Huotari and Hamari, 2017). We show that the design must take into account the specific objectives the gamification needs to fulfill and the context in which it will be applied, employing the appropriate *affordances* that enable the user to enjoy a truly *gameful* experience. It is also essential to determine whether the gamification has performed well in terms of producing the desired effects on the variables in question. The present study demonstrates that, when tourism-sector business owners seek to verify the suitability of the gamification strategy they have implemented, they should first evaluate the variables of intrinsic motivation (autonomy, competence, and relatedness) and enjoyment among their target publics.

The above findings indicate that a gamified environmental interpretation involves identifying and incorporating a carefully-structured combination of elements and changes to traditional environment interpretations. Some of the elements that can be incorporated are: 1) posing environmental conservation *challenges* instead of environmental problems; 2) enhancing the user's sense of autonomy by including customization options in the environmental interpretation (such as the choice of personal avatar, specific objectives to be achieved, scenarios, etc.); 3) fostering a sense of competition by including options to select the desired level of difficulty, receive continuous feedback on performance, achieve virtual trophies and/or badges, etc.; and 4) providing opportunities for interaction with others, such as the option to connect with other participants who share a similar motivation toward environmental conservation, and opportunities to share the gamification via social media or to generate virtual events, etc.

Finally, our results highlight the need for destinations to adapt their market-oriented strategies according to consumers' psychological distance. Destination managers must therefore be mindful of the international nature of tourism and the need to appeal to diverse target audiences that will present different degrees of psychological distance. It is shown here that, the greater this distance, the more the effectiveness of measures designed to promote environmentally-responsible behaviors may be adversely affected. Hence, managers need to identify strategies specifically for reaching those tourists for whom the destination is psychologically distant. In this regard, the use of gamification (in this case, applied to environmental interpretation) has been found to constitute an effective strategy to target tourists who, based on

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

their perceptions, feel psychologically distant from the destination, given its positive impact in terms of achieving greater pro-environmental learning, attitude, and behavior. However, our analysis revealed that gamification can also be effective among tourists for whom the destination is psychologically near, as both gamified and non-gamified versions of the experience were shown to deliver positive results among this group across these three dependent variables. In this case, destination managers can implement either strategy.

5.2. Limitations and future research directions

We now turn to certain limitations of the present study that could point to potential research themes for the future. First, we selected a single tourist destination for our analysis (albeit one that holds a leading position in incoming international tourism). The study could be replicated in different mature tourist destinations, to ascertain whether the use of environmental interpretation remains effective in a different geographical context. In the same vein, it could also be valuable for future studies to use different samples of tourists from other countries and perhaps compare the effectiveness of the gamified environmental interpretation strategy with respect to domestic tourists

Second, our study focused exclusively on one particular phase of the tourist experience (the pre-stay), so future research examining other phases (stay and post-stay, for instance) would be of interest as different factors would be at play. Similarly, there may be other influences that affect environmental interpretation and its outcomes, such as cultural differences among tourists.

Third, a quasi-experimental design was adopted in the present study, which made it possible to capture the immediate effect of participation in an environmental interpretation experience on the intention to adopt pro-environmental behaviors. For future research, it would be of interest to adopt other methodologies and approaches to measuring the effects of participation in an environmental interpretation when more time has elapsed and/or based on real behaviors performed by the participants.

Finally, the ‘new normal’ following the COVID-19 pandemic and its consequences constitute a particularly pertinent focus for scholarly research. In the tourist behavior context, research into behaviors that could help improve perceived destination safety would be extremely relevant, and here the study of the effectiveness of gamified environmental interpretation that is designed to achieve greater adherence to safety-aware conduct among visitors would be of particular interest.

6. References

- Aaker, J. L., & Lee, A. Y. (2006). Understanding regulatory fit. *Journal of Marketing Research*, 2437(1), 15–19.
- Abrahamse, W., & Matthies, E. (2018). Informational strategies to promote pro-environmental behaviour: Changing knowledge, awareness, and attitudes. *Environmental Psychology: An Introduction*, 261–272.
- Aguiar-Castillo, L., Rufo-Torres, J., De Saa-Pérez, P., & Pérez-Jiménez, R. (2018). How to encourage recycling behaviour? The case of WasteApp: A gamified mobile application. *Sustainability*, 10(5), 1–20.
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control* (pp. 11–39). Berlin, Heidelberg: Springer.
- Ardoin, N. M., Wheaton, M., Bowers, A. W., Hunt, C. A., & Durham, W. H. (2015). Nature-based tourism's impact on environmental knowledge, attitudes, and behavior: A review and analysis of the literature and potential future research. *Journal of Sustainable Tourism*, 23(6), 838–858.
- Aroean, L. (2012). Friend or foe: In enjoying playfulness, do innovative consumers tend to switch brand? *Journal of Consumer Behaviour*, 11(1), 67–80.
- Avnet, T., & Higgins, E. T. (2006). How regulatory fit affects value in consumer choices and opinions. *Journal of Marketing Research*, 43(1), 1–10.
- Ballantyne, R., Hughes, K., Lee, J., Packer, J., & Sneddon, J. (2018). Visitors' values and environmental learning outcomes at wildlife attractions: Implications for interpretive practice. *Tourism Management*, 64, 190–201.
- Ballantyne, R., Hughes, K., Lee, J., Packer, J., & Sneddon, J. (2021). Facilitating zoo/aquarium visitors' adoption of environmentally sustainable behaviour: Developing a values-based interpretation matrix. *Tourism Management*, 84, 104243.
- Ballantyne, R., Packer, J., & Falk, J. (2011). Visitors' learning for environmental sustainability: Testing short- and long-term impacts of wildlife tourism experiences using structural equation modelling. *Tourism Management*, 32(6), 1243–1252.
- Ballantyne, R., Packer, J., & Hughes, K. (2009). Tourists' support for conservation messages and sustainable management practices in wildlife tourism experiences. *Tourism Management*, 30(5), 658–664.
- Bar-Anan, Y., Liberman, N., Trope, Y., & Algom, D. (2007). Automatic processing of psychological distance: Evidence from a stroop task. *Journal of Experimental Psychology: General*, 136(4), 610–622.
- Becken, S., Whittlesea, E., Loehr, J., & Scott, D. (2020). Tourism and climate change: Evaluating the extent of policy integration. *Journal of Sustainable Tourism*, 28(10), 1603–1624.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Beerli, A., & Martín, J. D. (2004). Factors influencing destination image. *Annals of Tourism Research*, 26, 868–897.
- Bradley, J. C., Waliczek, T. M., & Zajicek, J. M. (1999). Relationship between environmental knowledge and environmental attitude of high school students. *The Journal of Environmental Education*, 30(3), 17–21.
- Burgers, C., Eden, A., Van Engelenburg, M. D., & Buningh, S. (2015). How feedback boosts motivation and play in a brain-training game. *Computers in Human Behavior*, 48, 94–103.
- Carmi, N., & Kimhi, S. (2015). Further than the eye can see: Psychological distance and perception of environmental threats. *Human and Ecological Risk Assessment: An International Journal*, 21(8), 2239–2257.
- Cesario, J., Higgins, E. T., & Scholer, A. A. (2008). Regulatory fit and persuasion: Basic principles and remaining questions. *Social and Personality Psychology Compass*, 2(1), 444–463.
- Chang, H., Zhang, L., & Xie, G. X. (2015). Message framing in green advertising: The effect of construal level and consumer environmental concern. *International Journal of Advertising*, 34(1), 158–176.
- Cheng, Y., Ao, C., Mao, B., & Xu, L. (2021). Influential factors of environmental behavior to reduce air pollution: Integrating theories of planned behavior and psychological distance. *Journal of Environmental Planning and Management*, 1–21 (in press).
- Cheung, L. T. O., & Fok, L. (2014). Assessing the role of ecotourism training in changing participants' pro-environmental knowledge, attitude and behaviour. *Asia Pacific Journal of Tourism Research*, 19(6), 645–661.
- Chou, H. Y., & Lien, N. H. (2012). The effects of incentive types and appeal regulatory framing in travel advertising. *Service Industries Journal*, 32(6), 883–897.
- Coghlan, A., & Carter, L. (2020). Serious games as interpretive tools in complex natural tourist attractions. *Journal of Hospitality and Tourism Management*, 42, 258–265.
- Coghlan, A., & Kim, A. K. (2012). Interpretive layering in nature-based tourism: A simple approach for complex attractions. *Journal of Ecotourism*, 11(3), 173–187.
- Coghlan, A., Ruth Fox, K., Prideaux, B., & Lück, M. (2011). Successful interpretation in great barrier reef tourism: Dive in or keep out of it? *Tourism in Marine Environments*, 7(3–4), 167–178.
- D'Agostino, R. B. (1998). Tutorial in biostatistics: Propensity score methods for bias reduction in the comparison of a treatment to a nonrandomized control group. *Statistics in Medicine*, 17(9), 2265–2281.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Deci, E. L., & Ryan, R. M. (1985). Conceptualizations of intrinsic motivation and self-determination. In *Intrinsic motivation and self-determination in human behavior* (pp. 11–40). New York: Springer.
- Delmas, M. A., Fischlein, M., & Asensio, O. I. (2013). Information strategies and energy conservation behavior: A meta-analysis of experimental studies from 1975 to 2012. *Energy Policy*, *61*, 729–739.
- Derrien, M. M., & Stokowski, P. A. (2017). Discourses of place: Environmental interpretation about Vermont forests. *Environmental Communication*, *11*(2), 276–287.
- Dolnicar, S. (2020). Designing for more environmentally friendly tourism. *Annals of Tourism Research*, *84*, 102933.
- Douglas, B. D., & Brauer, M. (2021). Gamification to prevent climate change: A review of games and apps for sustainability. *Current Opinion in Psychology*, *42*, 89–94.
- Eppmann, R., Bekk, M., & Klein, K. (2018). Gameful experience in gamification: Construction and validation of a gameful experience scale [GAMEX]. *Journal of Interactive Marketing*, *43*, 98–115.
- European Union. (2021). *European regional development fund*. Retrieved from https://ec.europa.eu/regional_policy/en/funding/erdf/.
- Fernández, G., & Ramos, A. G. (2015). Sustainability in tourism through environmental education applied to itineraries. *Revista de turism-studii si cercetari in turism*, (19), 8–14.
- Frías-Jamilena, D. M., Rodríguez-Molina, M. A., & Castañeda-García, J. A. (2008). Internet vs. travel agencies on pre-visit destination image formation: An information processing view. *Tourism Management*, *29*(1), 163–179.
- Gao, Y. L., Mattila, A. S., & Lee, S. (2016). A meta-analysis of behavioral intentions for environment-friendly initiatives in hospitality research. *International Journal of Hospitality Management*, *54*, 107–115.
- Gao, L., Scott, N., & Ding, P. (2016). Attributes, theme, and value of a visit to Zhouzhuang, China. *Journal of Destination Marketing & Management*, *5*(3), 239–248.
- Gössling, S. (2018a). Tourism, tourist learning and sustainability: An exploratory discussion of complexities, problems and opportunities. *Journal of Sustainable Tourism*, *26*(2), 292–306.
- Gössling, S. (2018b). ICT and transport behavior: A conceptual review. *International Journal of Sustainable Transportation*, *12*(3), 153–164.
- Gössling, S. (2021). Tourism, technology and ICT: A critical review of affordances and concessions. *Journal of Sustainable Tourism*, *29*(5), 733–750.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Gössling, S., McCabe, S., Chen, N., & C. (2020). A socio-psychological conceptualisation of overtourism. *Annals of Tourism Research*, *84*, 102976.
- Gössling, S., & Peeters, P. (2015). Assessing tourism's global environmental impact 1900–2050. *Journal of Sustainable Tourism*, *23*(5), 639–659.
- Grazzini, L., Rodrigo, P., Aiello, G., & Viglia, G. (2018). Loss or gain? The role of message framing in hotel guests' recycling behaviour. *Journal of Sustainable Tourism*, *26*(11), 1944–1966.
- Hair, J. F., Black, W. C., Babin, B. F., & Anderson, R. E. (2009). *Multivariate data analysis*. Madrid: Prentice Hall.
- Hall, C. M. (2019). Constructing sustainable tourism development: The 2030 agenda and the managerial ecology of sustainable tourism. *Journal of Sustainable Tourism*, *27*(7), 1044–1060.
- Ham, S. H. (1992). *Environmental interpretation: A practical guide for people with big ideas and small budgets*. North American Press.
- Ham, S. H. (2013). *Interpretation: A guide to making a difference on purpose*. Colorado: Fulcrum Publishing Golden.
- Hamari, J., & Koivisto, J. (2015a). Why do people use gamification services? *International Journal of Information Management*, *35*(4), 419–431.
- Hamari, J., & Koivisto, J. (2015b). Working out for likes": An empirical study on social influence in exercise gamification. *Computers in Human Behavior*, *50*, 333–347.
- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? - a literature review of empirical studies on gamification. In *Proceedings of the annual Hawaii international conference on system sciences* (pp. 3025–3034). IEEE Computer Society.
- Hamari, J., Shernoff, D. J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2016). Challenging games help students learn: An empirical study on engagement, flow and immersion in game-based learning. *Computers in Human Behavior*, *54*, 170–179.
- Hanus, M. D., & Fox, J. (2015). Computers & education assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education*, *80*, 152–161.
- Hernández-Ortega, B. (2018). Don't believe strangers: Online consumer reviews and the role of social psychological distance. *Information & Management*, *55*(1), 31–50.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, *52*(12), 1280–1300.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Higgins, E. T., Friedman, R. S., Harlow, R. E., Idson, L. C., Ayduk, O. N., & Taylor, A. (2001). Achievement orientations from subjective histories of success: Promotion pride versus prevention pride. *European Journal of Social Psychology, 31*(1), 3–23.
- Hoffman, D. L., & Novak, T. P. (1996). Marketing in hypermedia computer-mediated environments: Conceptual foundations. *Journal of Marketing, 60*(July), 50–68.
- Hofman, K., Walters, G., & Hughes, K. (2021). The effectiveness of virtual vs real-life marine tourism experiences in encouraging conservation behaviour. *Journal of Sustainable Tourism*, 1–25 (in press).
- Hsu, C. L., Chen, Y. C., Yang, T. N., & Lin, W. K. (2017). Do website features matter in an online gamification context? Focusing on the mediating roles of user experience and attitude. *Telematics and Informatics, 34*(4), 196–205.
- Huang, S., Weiler, B., & Assaker, G. (2015). Effects of interpretive guiding outcomes on tourist satisfaction and behavioral intention. *Journal of Travel Research, 54*(3), 344–358.
- Huotari, K., & Hamari, J. (2012). Defining gamification: A service marketing perspective. In *Proceeding of the 16th international academic MindTrek conference* (pp. 17–22).
- Huotari, K., & Hamari, J. (2017). A definition for gamification: Anchoring gamification in the service marketing literature. *Electronic Markets, 27*(1), 21–31. IndexMundi. (2019a).
- Perfil población estados unidos 2019*. Retrieved from https://www.indexmundi.com/es/estados_unidos/poblacion_perfil.html. IndexMundi. (2019b).
- Perfil población reino unido 2019*. Retrieved from https://www.indexmundi.com/es/reino_unido/poblacion_perfil.html.
- Ministerio de Industria, Comercio y Turismo. (2019). *Directrices generales de la Estrategia de Turismo sostenible de España 2030*. Retrieved from <https://turismo.gob.es/es-es/estrategia-turismo-sostenible/Documents/directrices-estrategia-turismo-sostenible.pdf>.
- INE. (2020). *Frontur*. Retrieved from <https://www.ine.es/daco/daco42/frontur/frontur1219.pdf>.
- IMI, Inventory, I. M. (1994). *Intrinsic motivation inventory (IMI). The intrinsic motivation inventory* (pp. 1–3). Scale description <https://selfdeterminationtheory.org/intrinsic-motivation-inventory/>. Retrieved from.
- Jacobs, M. H., & Harms, M. (2014). Influence of interpretation on conservation intentions of whale tourists. *Tourism Management, 42*, 123–131.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Jin, L., & He, Y. (2013). Designing service guarantees with construal fit: Effects of temporal distance on consumer responses to service guarantees. *Journal of Service Research, 16*(2), 202–215.
- Johnson, D., Horton, E., Mulcahy, R., & Foth, M. (2017). Gamification and serious games within the domain of domestic energy consumption: A systematic review. *Renewable and Sustainable Energy Reviews, 73*, 249–264.
- Jones, C., Hine, D. W., & Marks, A. D. (2017). The future is now: Reducing psychological distance to increase public engagement with climate change. *Risk Analysis, 37*(2), 331–341.
- Juvan, E., & Dolnicar, S. (2017). Drivers of pro-environmental tourist behaviours are not universal. *Journal of Cleaner Production, 166*, 879–890.
- Keppel, G. (1991). *Design and analysis. A researcher's handbook*. New Jersey: Prentice Hall.
- Kim, A. K. J. (2012). Determinants of tourist behaviour in coastal environmental protection. *Tourism Geographies, 14*(1), 26–49.
- Kim, Y., & Choi, S. M. (2005). Association for consumer research. Antecedents of green purchase behavior: An examination of collectivism, environmental concern, and pce antecedents of green purchase behavior: An examination of collectivism, environmental concern, and PCE. *Advances in Consumer Research, 32*, 592–599.
- Kim, M. J., & Hall, C. M. (2019). A hedonic motivation model in virtual reality tourism: Comparing visitors and non-visitors. *International Journal of Information Management, 46*, 236–249.
- Kim, J., Kim, P. B. C., Kim, J. E., & Magnini, V. P. (2016). Application of construal-level theory to promotional strategies in the hotel industry. *Journal of Travel Research, 55* (3), 340–352.
- Kirk, R. E. (1995). *Experimental design: Procedures for the behavioral sciences* (3rd ed.). Pacific Grove, CA: Brooks/Cole.
- Koema. (2018). *Relación empleo/población Estados Unidos*. Retrieved from <https://knoema.es/atlas/Estados-Unidos-de-Am%c3%a9rica/Relaci%c3%b3n-empleopoblaci%c3%b3n>.
- Koema. (2018). *Relación empleo/población Reino Unido*. Retrieved from <https://knoema.es/atlas/Reino-Unido/Relaci%c3%b3n-empleopoblaci%c3%b3n>.
- Koens, K., Klijs, J., Weber-Sabil, J., Melissen, F., Lalicic, L., Mayer, I., et al. (2020). Serious gaming to stimulate participatory urban tourism planning. *Journal of Sustainable Tourism*, 1–20 (in press).
- Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management, 45*, 191–210.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Landers, R. N., & Armstrong, M. B. (2017). Enhancing instructional outcomes with gamification: An empirical test of the Technology-Enhanced Training Effectiveness Model. *Computers in Human Behavior*, 71, 499–507.
- Le, D., Scott, N., & Wang, Y. (2021). Impact of prior knowledge and psychological distance on tourist imagination of a promoted tourism event. *Journal of Hospitality and Tourism Management*, 49, 101–111.
- Lee, T. H. (2009). A structural model for examining how destination image and interpretation services affect future visitation behavior: A case study of Taiwan's Taomi eco-village. *Journal of Sustainable Tourism*, 17(6), 727–745.
- Lee, S., Ally, & Oh, H. (2014). Effective communication strategies for hotel guests' green behavior. *Cornell Hospitality Quarterly*, 55(1), 52–63.
- Lee, A. Y., & Higgins, E. T. (2009). The persuasive power of regulatory fit. *Social Psychology of Consumer Behavior*, 319–333.
- Lee, T. H., Jan, F. H., & Chen, J. C. (2021). Influence analysis of interpretation services on ecotourism behavior for wildlife tourists. *Journal of Sustainable Tourism*, 1–19 (in press).
- Lee, A. Y., Keller, P. A., & Sternthal, B. (2010). Value from regulatory construal fit: The persuasive impact of fit between consumer goals and message concreteness. *Journal of Consumer Research*, 36(5), 735–747.
- Lehman, P. K., & Geller, E. S. (2004). Behavior analysis and environmental protection: Accomplishments and potential for more. *Behavior and Social Issues*, 13(1), 13–32.
- Lerner, E., Streicher, B., Sachs, R., Raue, M., & Frey, D. (2015). The effect of construal level on risk-taking. *European Journal of Social Psychology*, 45(1), 99–109.
- Lewin, K. (1951). *Field Theory in Social Science*. New York: Harper. Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology*, 75(1), 5–18.
- Liberman, N., & Trope, Y. (2014). Traversing psychological distance. *Trends in Cognitive Sciences*, 18(7), 364–369.
- Lieberoth, A. (2015). Shallow gamification: Testing psychological effects of framing an activity as a game. *Games and Culture*, 10(3), 229–248.
- Liu, C. R., Wang, Y. C., Huang, W. S., & Tang, W. C. (2019). Festival gamification: Conceptualization and scale development. *Tourism Management*, 74, 370–381.
- Luo, Z. (2021). *Gamification for educational purposes: What are the factors contributing to varied effectiveness?* Education and Information Technologies (in press).

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Malhotra, N. K. (2010). *Marketing research. An applied orientation*. New Jersey: Prentice Hall.
- Martocchio, J. J., & Webster, J. (1992). Effects of feedback and cognitive playfulness on performance in microcomputer software training. *Personnel Psychology, 45*(3), 553–578.
- Miao, L., & Mattila, A. S. (2013). The impact of other customers on customer experiences: A psychological distance perspective. *Journal of Hospitality & Tourism Research, 37* (1), 77–99.
- Moscardo, G., & Benckendorff, P. (2015). *Education for sustainability in tourism*. Berlin. Heidelberg: Springer-Verlag.
- Nenkov, G. Y. (2012). It's all in the mindset: Effects of varying psychological distance in persuasive messages. *Marketing Letters, 23*(3), 615–628.
- Ordaz, J., Melgar, M. C., & Rubio, C. (2014). *Métodos estadísticos y Económicos en la empresa y para finanzas* (pp. 1–237). Universidad Pablo de Olavide.
- Ouariachi, T., Li, C. Y., & Elving, W. J. (2020). Gamification approaches for education and engagement on pro-environmental behaviors: Searching for best practices. *Sustainability, 12*(11), 4565.
- Perdue, B. C., & Summers, J. O. (1986). Checking the success of manipulations in marketing experiments. *Journal of Marketing Research, 23*(4), 317–326.
- Pike, S., Pontes, N., & Kotsi, F. (2021). Stopover destination attractiveness: A quasi-experimental approach. *Journal of Destination Marketing & Management, 19*, 100514.
- Polo-Peña, A. I., Frías-Jamilena, D. M., & Fernández-Ruano, M. L. (2020). Influence of gamification on perceived self-efficacy: Gender and age moderator effect. *International Journal of Sports Marketing & Sponsorship, 22*(3), 453–476.
- Powell, R. B., & Ham, S. H. (2008). Can ecotourism interpretation really lead to pro-conservation knowledge, attitudes and behaviour? Evidence from the galapagos islands. *Journal of Sustainable Tourism, 16*(4), 467–489.
- Powell, R. B., Kellert, S. R., & Ham, S. H. (2009). Interactional theory and the sustainable nature-based tourism experience. *Society & Natural Resources, 22*(8), 761–776.
- Powell, R. B., Vezeau, S. L., Stern, M. J., Moore, D. W. D., & Wright, B. A. (2018). Does interpretation influence elaboration and environmental behaviors? *Environmental Education Research, 24*(6), 875–888.
- Pulido-Fernández, J. I., Cárdenas-García, P. J., & Espinosa-Pulido, J. A. (2019). Does environmental sustainability contribute to tourism growth? An analysis at the country level. *Journal of Cleaner Production, 213*, 309–319.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Roberts, M., Mearns, K., & Edwards, V. (2014). Evaluating the effectiveness of guided versus non-guided interpretation in the Kruger National Park, South Africa. *Koedoe*, 56(2), 1–18.
- Rosenbaum, P. R., & Rubin, D. B. (1984). Reducing bias in observational studies using subclassification on the propensity score. *Journal of the American Statistical Association*, 79(387), 516–524.
- Schill, M., & Shaw, D. (2016). Recycling today, sustainability tomorrow: Effects of psychological distance on behavioural practice. *European Management Journal*, 34(4), 349–362.
- Scott, D., Hall, C. M., & Gössling, S. (2019). Global tourism vulnerability to climate change. *Annals of Tourism Research*, 77, 49–61.
- Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *International Journal of Human-Computer Studies*, 74, 14–31.
- Shin, S., Chung, N., Kang, D., & Koo, C. (2016). How far, how near psychological distance matters in online travel reviews: A test of construal-level theory. In *Information and communication technologies in tourism 2016* (pp. 355–368). Springer International Publishing.
- Sigala, M. (2015). The application and impact of gamification funware on trip planning and experiences: The case of TripAdvisor's funware. *Electronic Markets*, 25(3), 189–209.
- Souza, V. S., Marques, S. R. B., & Veríssimo, M. (2020). How can gamification contribute to achieve SDGs? : Exploring the opportunities and challenges of ecogamification for tourism. *Journal of Hospitality and Tourism Technology*, 11(2), 255–276.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, 29(3), 309–317.
- Stephan, E., Liberman, N., & Trope, Y. (2010). Politeness and psychological distance: A construal level perspective. *Journal of Personality and Social Psychology*, 98(2), 268–280.
- Tan, W. K. (2018). From fantasy to reality: A study of pre-trip planning from the perspective of destination image attributes and temporal psychological distance. *Service Business*, 12(1), 65–84.
- Tan, E., & Law, R. (2016). mLearning as a softer visitor management approach for sustainable tourism. *Journal of Sustainable Tourism*, 24(1), 132–152.
- Trope, Y., Ledgerwood, A., Liberman, N., & Fujita, K. (2021). Regulatory scope and its mental and social supports. *Perspectives on Psychological Science*, 16(2), 204–224.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, 117(2), 440–482.
- Trope, Y., Liberman, N., & Wakslak, C. (2007). Construal levels and psychological distance. *Journal of Consumer Psychology*, 17(2), 83–95.
- UNWTO. (2017). *Tourism and the sustainable development goals – journey to 2030*. Madrid: UNWTO. <https://doi.org/10.18111/9789284419401>. Retrieved from.
- UNWTO. (2020a). *One planet vision for a responsible recovery of the tourism sector*. Retrieved from <https://www.unwto.org/es/covid-19-oneplanet-recuperacion-responsable>.
- UNWTO. (2020b). *Panorama del Turismo Internacional, Edición 2019*. Retrieved from <https://www.unwto.org/es/publication/panorama-turismo-internacional-2019>.
- Uriel, E. (1995). *Análisis de datos. Series temporales y análisis multivariante*. Madrid: Editorial AC.
- Van Boven, L., Kane, J., McGraw, A. P., & Dale, J. (2010). Feeling close: Emotional intensity reduces perceived psychological distance. *Journal of Personality and Social Psychology*, 98(6), 872–885.
- Van der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, 28(4), 695–704.
- Walker, K., & Moscardo, G. (2014). Encouraging sustainability beyond the tourist experience: Ecotourism, interpretation and values. *Journal of Sustainable Tourism*, 22 (8), 1175–1196.
- Wang, C., Zhang, J., Yu, P., & Hu, H. (2018). The theory of planned behavior as a model for understanding tourists' responsible environmental behaviors: The moderating role of environmental interpretations. *Journal of Cleaner Production*, 194, 425–434.
- Weiler, B., & Ham, S. H. (2010). Development of a research instrument for evaluating the visitor outcomes of face-to-face interpretation. *Visitor Studies*, 13(2), 187–205.
- Wicker, P., & Becken, S. (2013). Conscientious vs. ambivalent consumers: Do concerns about energy availability and climate change influence consumer behaviour? *Ecological Economics*, 88, 41–48.
- Wilcox, R. (1987). New designs in analysis of Variance. *Annual Review of Psychology*, 38, 29–60.
- Wu, J., & Liu, D. (2007). The effects of trust and enjoyment on intention to play online games. *Journal of Electronic Commerce Research*, 8(2), 128–140.
- Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism Management*, 60, 244–256.

Capítulo VIII: Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance

- Xu, H., Cui, Q., Ballantyne, R., & Packer, J. (2013). Effective environmental interpretation at Chinese natural attractions: The need for an aesthetic approach. *Journal of Sustainable Tourism, 21*(1), 117–133.
- Zanutto, E. L., Lu, B., & Hornik, R. (2005). Using propensity score subclassification for multiple treatment doses to evaluate a National Anti-Drug Media Campaign. *Journal of Educational and Behavioral Statistics, 30*, 59–73.
- Zikmund, W. G. (1998). *Essentials of marketing research*. Harcourt Brace College Publishers.

Capítulo IX: Conclusiones

1. Discusión de los resultados y conclusiones principales

El principal objetivo de los gestores de los destinos turísticos es aumentar su competitividad, la cual en la actualidad está íntimamente relacionada con el nivel de conservación de los recursos (Pulido-Fernández et al., 2019; Scott et al., 2019). Por tanto, a diferencia del pasado, se ha ido haciendo evidente la necesidad de reorientar y priorizar el uso de estrategias que sean compatibles con la sostenibilidad medioambiental del destino turístico (Oviedo-García, Castellanos-Verdugo, Vega-Vázquez, y Orgaz-Agüera, 2017). En este sentido, la presente investigación, se ha centrado en la interpretación ambiental como una estrategia efectiva para mejorar la sostenibilidad medioambiental del destino turístico. La interpretación ambiental no solo tiene efectos positivos en el comportamiento proambiental de los turistas y el capital de marca del destino turístico, sino que además mejora la experiencia turística por lo que se convierte en una opción ideal para los gestores de los destinos turísticos.

Considerando las premisas de la literatura, existen dudas acerca de la eficacia de la interpretación ambiental (p.e., Lee, Jan y Chen, 2021), por lo que en esta investigación se ha aportado un mayor conocimiento en relación con: 1) la experiencia de participar en una gamificación (la experiencia *gameful*) y su medición (artículo uno y dos); 2) el diseño gamificado de una interpretación ambiental aplicada a un destino turístico maduro no especializado en turismo de naturaleza (artículo dos); 3) el efecto que la participación en una interpretación ambiental gamificada ejerce en el valor percibido del destino (artículo dos), en el capital de marca del destino (artículo tres) y en el comportamiento proambiental (artículo cuatro); 4) el efecto que la distancia psicológica hacia el destino ejerce en el capital de marca del destino (artículo tres) y en el comportamiento proambiental (artículo cuatro); y 5) el efecto moderador de la distancia psicológica sobre el efecto que la participación en una interpretación ambiental gamificada ejerce en el capital de marca (artículo tres) y el comportamiento proambiental (cuatro).

En primer lugar, se llevó a cabo una revisión de la literatura sobre gamificación, para proponer y desarrollar una escala que permitiera medir la experiencia tras participar en una gamificación, la llamada experiencia *gameful*. La cuestión de cómo medir mejor la experiencia *gameful* y qué escalas aplicar (Eppmann et al., 2018; Högberg, Hamari y Wästlund, 2019; Koivisto y Hamari, 2019; Leclercq, Poncin y Hammedi, 2020) es un tema de interés para la literatura y se demanda más investigación al respecto. En el artículo uno, se recoge la nueva escala desarrollada y validada, que incluye las dimensiones de motivaciones intrínsecas (autonomía, competencia y relación) y diversión, alcanzada por los participantes durante su participación en la gamificación. En ese sentido, la contribución de este trabajo constituye un paso importante hacia la generalización de la medición de este constructo.

En segundo lugar, en relación con el diseño gamificado de una interpretación ambiental, se llevó a cabo una profunda revisión de la literatura que permitió desarrollar y proponer una interpretación ambiental de un destino turístico gamificada, tal y como se recoge en el artículo dos. El diseño de la interpretación ambiental gamificada y su efectividad requiere: 1) diseñarla siguiendo las pautas marcadas por la literatura y no simplemente como la unión de varios elementos de juegos; 2) evaluar la experiencia generada en el participante (la llamada experiencia *gameful*); y 3) comprobar sus efectos en el comportamiento de los participantes (p.e., Hamari, 2017; Seaborn y Fels, 2015). En cuanto al diseño de gamificación, no existe un método único que sea válido para todos los ámbitos de aplicación (Robson, Plangger, Kietzmann, McCarthy, y Pitt, 2015; Seaborn y Fels, 2015). En este estudio identificamos que era necesario seguir un enfoque holístico. El proceso aportado incluye las siguientes etapas: 1) análisis del objetivo de la gamificación; 2) análisis del contexto y de los participantes; 3) diseño de la interfaz a través de la cual el participante participará en la gamificación, que determina las tareas a realizar y las reglas a seguir en su realización, siendo de suma importancia llegar a la combinación óptima de *affordances* que den lugar a una experiencia *gameful*; y 4) evaluación de la gamificación.

Para evaluar la gamificación, como recoge el artículo dos, se procedió a testar la experiencia *gameful* (que aparece desarrollada y validada en el artículo uno). Se consiguió validar la escala en el contexto turístico para una interpretación ambiental gamificada con lo que, no solo se siguió profundizando en el estudio de la experiencia *gameful* sino que, además, estos resultados son relevantes para el ámbito turístico porque tanto la motivación como la diversión son elementos críticos para el turista (p.e., Polo-Peña, Frías-Jamilena, y Rodríguez-Molina, 2012).

En tercer lugar, una vez comprobado que la interpretación ambiental gamificada genera una experiencia intrínsecamente motivadora y divertida (una experiencia *gameful*) para los participantes capaz de influir en su comportamiento, se estudió el efecto de una interpretación ambiental gamificada en variables del comportamiento del consumidor. Como se expone en el artículo dos, se comprobó que existe un efecto positivo y significativo en el valor percibido hacía el destino turístico. Además, se propuso testar si la adopción de un diseño gamificado consigue mejorar la eficacia de la interpretación ambiental en variables clave para la competitividad del destino como es el capital de marca, puesto que atendiendo a la literatura una forma de mejorar la competitividad del destino turístico es mejorar el capital de marca (Bastos y Levy, 2012; Pike y Page, 2014) y el comportamiento proambiental, puesto que un destino turístico con el medio ambiente degradado perdería su atractivo y su competitividad (Scott, Hall y Gössling, 2019) y los turistas dañan el medio ambiente de muchas maneras diferentes (Dolnicar, 2020; Gössling y Peeters, 2015; Juvan y Dolnicar, 2017). Para alcanzar este objetivo, se adoptó un diseño cuasi-experimental en el que de forma novedosa se propuso una interpretación ambiental gamificada frente a otra no gamificada y se testó su efecto en la variable capital de marca del destino y en la variable comportamiento proambiental de los turistas.

La literatura ha mostrado un continuo interés en estudiar si la gamificación puede considerarse una estrategia válida para mejorar la competitividad de los destinos turísticos (p.e., Abou-Shouk y Solliman, 2021; Xu et al., 2016, 2017); y, en este punto, el presente estudio indaga si el diseño, gamificado versus no gamificado, influye en los resultados de la interpretación ambiental (Ardoin et al., 2015). Como se expone en el artículo tres, los resultados indicaron que la participación en una interpretación ambiental gamificada ejerce un mayor efecto positivo en el capital de marca frente a la interpretación ambiental no gamificada, lo que constituye una nueva contribución a la literatura en el contexto de los destinos turísticos. Este hallazgo es consistente con la literatura previa que también encontró que este es el caso para otros contextos de aplicación y en relación con otras variables de comportamiento del consumidor (p.e., Hamari y Koivisto, 2014; Xu et al., 2017).

Los resultados, recogidos en el artículo cuatro, también muestran que el diseño de la interpretación influye en los resultados de esa experiencia (Ardoin et al., 2015); y la interpretación ambiental gamificada arroja un mayor efecto positivo que la versión no gamificada en las variables de aprendizaje, actitud e intención de comportamiento proambiental (todas ellas variables clave para la sostenibilidad medioambiental de los destinos turísticos). Este hallazgo es consistente con otros estudios que demostraron el efecto positivo de la gamificación en comportamientos proambientales como el reciclaje, el uso de medios de transporte que generan menos contaminación, etc. (p.e., Douglas y Brauer, 2021; Gössling, 2018b; Johnson et al. al., 2017; Ouariachi et al., 2020). Los presentes resultados constituyen, por tanto, un avance sobre la literatura existente que trata de contribuir al turismo sostenible en los destinos turísticos.

En cuarto lugar, se comprobó la importancia de las características del participante en la eficacia de la interpretación ambiental. Concretamente, se comprobó como la distancia psicológica hacia el destino podía afectar a la eficacia de la interpretación ambiental sobre el capital de marca y el comportamiento proambiental. Considerar la distancia psicológica hacia el destino resulta relevante porque la literatura reconoce que ejerce una influencia fundamental en las decisiones y valoraciones que hacen los individuos (Liberman, Trope, y Wakslak, 2007; Trope et al., 2007) y porque, hasta ahora, ningún estudio ha capturado datos previos sobre los efectos de la distancia psicológica en la interpretación ambiental. Los resultados mostraron que, para los turistas con una distancia psicológica hacia el destino lejana, el efecto de la participación en una interpretación ambiental tanto en el capital de marca, como se muestra en el artículo tres, como en el comportamiento proambiental, recogido en el artículo cuatro, es significativamente menor que el alcanzado por los turistas con una distancia psicológica hacia el destino cercana. Esto significa que la interpretación ambiental, independientemente del tipo de diseño, será menos efectiva entre los turistas con una distancia psicológica hacia el destino lejana. Estos nuevos hallazgos están en línea con estudios previos que señalan mejores resultados de las estrategias y acciones de marketing en los consumidores con distancia psicológica cercana en variables de comportamiento del consumidor (Darke, Brady, Benedicktus, y Wilson, 2016; Lii, Wu, y Ding, 2013; Holmqvist, Guest y Grönroos, 2015) y en variables

relacionadas con el comportamiento proambiental (Cheng, Ao, Mao, y Xu, 2021; Jones et al., 2017; Schill y Shaw, 2016) y apuntan a la necesidad de identificar estrategias más efectivas, especialmente dirigidas a los turistas con distancia psicológica hacia el destino lejano, necesidad que proporciona la base para la contribución final del estudio, que se describe a continuación.

En quinto lugar, basándose en las contribuciones previas de la literatura, se estudia la posibilidad de un “ajuste regulatorio conceptual” que pueda hacer que el mensaje sea más afectivo. Así, se estudia la posibilidad de que la distancia psicológica modere el efecto que el diseño de la interpretación ambiental (no gamificado versus gamificado) genera en el capital de marca y en el comportamiento proambiental. Buscando este ajuste, se propone un modelo de investigación novedoso que estudia conjuntamente el potencial de ajuste entre los factores del diseño de la interpretación ambiental (gamificado versus no gamificado) y también los que afectan a los participantes (con distancia psicológica cercana versus lejano). La evaluación de ambos escenarios, basada en un estudio empírico y un diseño cuasi-experimental (en el que se manipuló la participación en una interpretación ambiental gamificada versus una versión no gamificada y se clasificó a los sujetos según su distancia psicológica hacia el destino), proporcionó evidencia empírica de un ajuste regulatorio conceptual. Si bien la literatura ha señalado la necesidad de estudiar cómo el ajuste de un tipo de interpretación frente a otro puede estar determinado por las características de los participantes (p.e., Ballantyne et al., 2018; Kim, 2012; Powell et al., 2009), estos hallazgos pueden considerarse una aportación original ya que ningún estudio previo, hasta donde se ha podido determinar, ha analizado conjuntamente los factores que influyen en la propia experiencia interpretativa (gamificada versus no gamificada) y los que afectan a los participantes (con distancia psicológica cercana versus lejano al destino) junto con el ajuste potencial entre ellos.

Los resultados mostraron que la distancia psicológica hacia el destino modera el efecto del tipo de interpretación ambiental (gamificado versus no gamificado) en el capital de marca y en el comportamiento proambiental. Como un nuevo hallazgo, el estudio identificó que, para individuos con una distancia psicológica hacia el destino lejano, una interpretación ambiental gamificada genera un resultado en el capital de marca (artículo tres) y el comportamiento proambiental (artículo cuatro) significativamente más alto que la versión no gamificada. Sin embargo, para individuos con una distancia psicológica hacia el destino cercano, no hay diferencias significativas en el capital de marca ni comportamiento proambiental entre las versiones gamificadas y no gamificadas. Esto puede explicarse por el hecho de que ambos tipos de interpretación ambiental brindan el mismo servicio principal (Huotari y Hamari, 2012). Este resultado confirma la existencia de un ajuste regulatorio conceptual, por lo que se recomienda la gamificación como una estrategia eficaz para dirigirse a los turistas que perciben el destino como psicológicamente lejano, lo que es especialmente relevante si se tiene en cuenta que presentan peores resultados en el capital de marca así como en el comportamiento proambiental frente a los turistas con una distancia psicológica cercana. En conjunto, estos hallazgos demuestran la efectividad de la gamificación para ambos perfiles de turistas (con

distancia psicológica hacia el destino cercana y lejana). Esta contribución resulta novedosa para la literatura y agregan un mayor valor a los muchos estudios existentes que muestran la importancia de un ajuste entre el estímulo y la mentalidad del individuo (Avnet y Higgins, 2006; Cesario, Higgins y Scholer, 2008; Chou y Lien, 2012; Grazzini et al., 2018).

2. Implicaciones para la gestión

Desde un punto de vista práctico, los resultados ofrecen varias implicaciones tanto para entidades públicas como para las empresas privadas que operan en el sector turístico, sobre todo en la contribución a los esfuerzos para lograr los objetivos de desarrollo sostenible y alcanzar una mayor competitividad. La cuestión de cómo mejorar la sostenibilidad de los destinos es ahora una cuestión de urgencia a escala mundial (p.e., Unión Europea, 2021; OMT, 2022a, b). Este tema no solo es relevante en términos de la conservación continua del entorno natural en los destinos turísticos, sino que también es fundamental para que los destinos mantengan su atractivo y su capacidad de atraer turistas a medio-largo plazo.

El presente estudio demuestra, en particular, la efectividad de una interpretación ambiental gamificada online en la fase previa a la estancia. Los destinos turísticos ofreciendo una interpretación ambiental gamificada online, pueden mejorar la experiencia de los turistas potenciales y fomentar un comportamiento proambiental. Se ha demostrado que esta es una estrategia efectiva para aumentar el valor percibido del destino, el capital de marca y el conocimiento, la actitud y el comportamiento proambiental. Por tanto, es una estrategia adecuada para muchos destinos turísticos maduros (como es el caso de España), para que sigan atrayendo turistas a medio-largo plazo.

En la fase previa a la estancia, la búsqueda de información es fundamental para la decisión de los turistas de optar por un destino u otro. En este sentido, las posibilidades que ofrecen las TICs han alterado no solo cómo las personas encuentran información sobre los destinos y realizan sus compras de viajes, sino también cómo experimentan, comunican y perciben los destinos (Agapito y Lacerda, 2014). Se sabe que la interpretación ambiental logra mejores resultados cuando los visitantes pueden interactuar con los guías turísticos (Ballantyne et al., 2009; Coghlan y Kim, 2012; Coghlan et al., 2011; Xu, Cui, Ballantyne, y Packer, 2013). Los resultados del presente estudio indican que es recomendable que el sector utilice la gamificación a través de medios online como una estrategia aún más atractiva y novedosa para implementar la interpretación ambiental dado que incorpora la posibilidad de interacción del participante con la propia interpretación ambiental. La gamificación permite a los turistas explorar el destino a través de un formato innovador, interactivo y personalizado (Xu et al., 2017), alcanzando un impacto aún mayor en el medio online (Hsu, Chen, Yang y Lin, 2017). Ello puede ayudar a complementar la actuación de los guías turísticos humanos o sustituirlos en casos en los que no sea posible la participación de los guías turísticos humanos que tradicionalmente siempre han brindado interpretación ambiental (Kim y Hall, 2019).

Este trabajo también proporciona información relevante sobre el diseño de la gamificación. El diseño no debe limitarse simplemente a unir elementos propios de los juegos o centrarse exclusivamente en la vertiente sistémica de los juegos (Huotari y Hamari, 2017). Se ha de adoptar un enfoque holístico siguiendo un proceso sistemático que comprenda varias etapas. En primer lugar, los profesionales del sector turístico deben considerar los objetivos específicos que debe cumplir la gamificación para asegurarse que es una solución adecuada para el problema o necesidad subyacente (Morschheuser et al., 2017; Robson et al., 2015).

En segundo lugar, han de estudiar el contexto de uso identificando a los usuarios a los que va dirigida (Marache-Francisco, Brangier, y Perseus, 2013; Morschheuser et al., 2017). Los usuarios han de sentirse identificados con la gamificación para poder tener una conexión más profunda y lograr una experiencia más significativa. Si el usuario consigue una experiencia más significativa, esto puede dar lugar a resultados más trascendentes en otras variables objetivo (Sigala, 2015).

En tercer lugar, han de buscar la combinación óptima de *affordances* para que el usuario disfrute de una experiencia *gameful* (se trata de diseñar una combinación de *affordances* que motiven a los participantes a aprender cómo mejorar la sostenibilidad de un destino turístico mientras disfrutan de esa participación). Algunos de los *affordances* que se pueden incorporar son: 1) plantear desafíos sobre la forma de proteger el medio ambiente en lugar de plantear directamente los problemas ambientales; 2) mejorar el sentimiento de autonomía del usuario al incluir opciones de personalización en la interpretación ambiental (p.e., con avatares); 3) fomentar el sentimiento de competencia al recibir retroalimentación continua sobre el desempeño, lograr trofeos y/o insignias virtuales, etc.; y 4) brindar oportunidades para que el usuario puede interactuar con otros usuarios y compartir su motivación hacia la protección del medio ambiente (p.e., a través de las redes sociales o generar eventos virtuales)

En cuarto lugar y, sobre todo, si los empresarios del sector turístico quieren probar la idoneidad de la estrategia de gamificación que han implementado, como demuestra esta investigación, deben evaluar las variables de motivación intrínseca (autonomía, competencia y relación) y diversión entre los participantes para, posteriormente, comprobar su efecto en las variables de comportamiento de los participantes. La parte final de evaluación, en la que se verifica si se ha logrado una experiencia *gameful*, es esencial para discernir si la gamificación ha tenido éxito.

En último lugar, se sugiere que las estrategias de mercado puedan ser adaptadas de acuerdo con la distancia psicológica hacia el destino. Este es un aspecto particularmente crítico cuando se considera la naturaleza internacional del turismo y la necesidad de atraer a un público objetivo diverso. Dado que, a mayor distancia psicológica, menor efecto tienen las acciones de marketing, así como las medidas diseñadas para promover un comportamiento ambientalmente responsable, es necesario identificar estrategias válidas para llegar a aquellos turistas que perciben el destino como psicológicamente lejano. En este escenario, es útil saber que el uso de la gamificación (en este caso aplicada a la interpretación ambiental) se ha revelado

como una estrategia eficaz para dirigirse a los turistas que, en base con sus percepciones, se sienten psicológicamente lejanos del destino, dada su impacto positivo en términos de mayores valores de capital de marca, aprendizaje, actitud y comportamiento proambiental. No obstante, el análisis reveló que el uso de la gamificación también resultó efectivo entre los turistas que perciben el destino como psicológicamente cercano. En este colectivo, tanto los tipos de interpretación ambiental gamificados como los no gamificados son igualmente efectivos en términos de capital de marca y los gerentes pueden optar por cualquiera de las dos estrategias. En general, los resultados de este estudio sugieren que los gerentes y profesionales del sector turístico encontrarán que la interpretación ambiental gamificada es efectiva entre los turistas que perciben el destino como psicológicamente lejano, pero también funciona bien para aquellos que perciben el destino como cercano. En definitiva, se trata de una estrategia muy recomendable que atiende a las distintas preferencias que puede presentar el mercado turístico internacional (en base con la distancia psicológica hacia el destino), y que además está bien alineada con las posibilidades que ofrece Internet para acceder a un mercado globalizado.

3. Limitaciones del trabajo y futuras líneas de investigación

Como toda investigación, el presente trabajo asume ciertas limitaciones que podrían abordarse en futuras investigaciones, que lleva a que los resultados alcanzados deban ser interpretados con cautela y que son detalladas en cada uno de los cuatro artículos. En primer lugar, aunque se seleccionó un destino turístico reconocido por su posición de liderazgo en el turismo internacional, sería interesante replicar este estudio en otros destinos turísticos, especialmente en otros destinos turísticos maduros que no se especializan en turismo de naturaleza, para determinar si el uso de la interpretación ambiental y su diseño gamificado sigue siendo efectivo en un contexto geográfico turístico diferente. En la misma línea, también podría ser valioso para futuros estudios utilizar diferentes muestras de turistas de otros países (con diferentes distancias psicológicas hacia el destino) y quizás comparar la efectividad de la estrategia de interpretación ambiental gamificada con respecto a los turistas nacionales.

En segundo lugar, otras direcciones de investigación futuras podrían incluir otros factores que puedan afectar el diseño de la interpretación ambiental y sus resultados, como las diferencias culturales entre los turistas. Esta investigación también podría realizarse en otras fases de la experiencia turística —durante la estancia y después de la estancia— en las que intervendrían diferentes factores.

En tercer lugar, en el presente estudio se adoptó por una parte la metodología de modelos de ecuaciones estructurales y por otra un diseño cuasi-experimental, que permitió captar el efecto inmediato de la participación en una interpretación ambiental sobre el capital de marca del destino y el comportamiento proambiental de los turistas. Para futuras investigaciones, sería de interés adoptar otras metodologías y enfoques para medir los efectos de la participación en una interpretación ambiental

cuando haya transcurrido más tiempo y/o basados en comportamientos reales realizados por los participantes.

Finalmente, un foco de investigación especialmente relevante en la actualidad es el de las consecuencias de la ‘nueva normalidad’ en la industria turística derivada de la pandemia del COVID-19, unido a la necesidad de seguir avanzando hacia la consecución de los objetivos de desarrollo sostenible. Sería interesante avanzar en el estudio de la eficacia de la interpretación ambiental gamificada en determinadas variables que son especialmente críticas para los destinos turísticos en la actualidad. Como puede ser la seguridad percibida en el destino en circunstancias extraordinarias, como las que se pueden derivar de posibles crisis sanitarias futuras.

Capítulo X: Bibliografía

- Abou-Shouk, M., & Solliman, M. (2021). The impact of gamification adoption intention on brand awareness and loyalty in tourism: The mediating effect of customer engagement. *Journal of Destination Marketing & Management*, 20 (June), 100559.
- Abrahamse, W., & Matthies, E. (2018). Informational strategies to promote pro-environmental behaviour: Changing knowledge, awareness, and attitudes. *Environmental Psychology: An Introduction*, 261–272.
- Agapito, D., & Lacerda, A. (2014). Marketing and brand design of destination experiences: The role of ICT. *Journal of Spatial and Organizational Dynamics*, 2(3), 201-216.
- Aguiar-Castillo, L., Rufo-Torres, J., De Saa-Pérez, P., & Pérez-Jiménez, R. (2018). How to encourage recycling behaviour? The case of WasteApp: A gamified mobile application. *Sustainability*, 10(5), 1–20.
- Ahn, J., & Kwon, J. (2020). Green hotel brands in Malaysia: perceived value, cost, anticipated emotion, and revisit intention. *Current Issues in Tourism*, 23(12), 1559-1574.
- Aparicio, A. F., Vela, F. L. G., Sánchez, J. L. G., & Montes, J. L. I. (2012). Analysis and application of gamification. *Proceedings of the 13th International Conference on Interacción Persona-Ordenador*, 1-2.
- Ardoin, N. M., Wheaton, M., Bowers, A. W., Hunt, C. A., & Durham, W. H. (2015). Nature-based tourism's impact on environmental knowledge, attitudes, and behavior: a review and analysis of the literature and potential future research. *Journal of Sustainable Tourism*, 23(6), 838–858.
- Avnet, T., & Higgins, E. T. (2006). How regulatory fit affects value in consumer choices and opinions. *Journal of Marketing Research*, 43(1), 1–10.
- Ballantyne, R., Packer, J., & Falk, J. (2011). Visitors' learning for environmental sustainability: Testing short- and long-term impacts of wildlife tourism experiences using structural equation modelling. *Tourism Management*, 32(6), 1243–1252.
- Ballantyne, R., Hughes, K., Lee, J., Packer, J., & Sneddon, J. (2021). Facilitating zoo/aquarium visitors' adoption of environmentally sustainable behaviour: Developing a values-based interpretation matrix. *Tourism Management*, 84, 104243.
- Ballantyne, R., Hughes, K., Lee, J., Packer, J., & Sneddon, J. (2018). Visitors' values and environmental learning outcomes at wildlife attractions: Implications for interpretive practice. *Tourism Management*, 64, 190-201.

- Ballantyne, R., Packer, J., & Hughes, K. (2009). Tourists' support for conservation messages and sustainable management practices in wildlife tourism experiences. *Tourism Management*, 30(5), 658–664.
- Bastos, W., & Levy, S.J. (2012). A history of the concept of branding: Practice and theory. *Journal of Historical Research in Marketing*, 4(3), 347-368.
- Becken, S., Whittlesea, E., Loehr, J., & Scott, D. (2020). Tourism and climate change: Evaluating the extent of policy integration. *Journal of Sustainable Tourism*, 28(10), 1603–1624.
- Blancas, F.J., González, M., Guerrero, F.M., & Lozano, M. (2010). Indicadores sintéticos de turismo sostenible: una aplicación para los destinos turísticos de Andalucía. *Rect@: Revista Electrónica de Comunicaciones y Trabajos de ASEPUMA*, (11), 85-118.
- Blancas, F.J., Lozano, M., & González, M. (2015). A European sustainable tourism labels proposal using a composite indicator. *Environmental Impact Assessment Review*, 54, 39-54.
- Cesario, J., Higgins, E. T., & Scholer, A. A. (2008). Regulatory fit and persuasion: Basic principles and remaining questions. *Social and Personality Psychology Compass*, 2(1), 444–463.
- Chang, H., Zhang, L., & Xie, G. X. (2015). Message framing in green advertising: The effect of construal level and consumer environmental concern. *International Journal of Advertising*, 34(1), 158–176.
- Cheng, Y., Ao, C., Mao, B., & Xu, L. (2021). Influential factors of environmental behavior to reduce air pollution: Integrating theories of planned behavior and psychological distance. *Journal of Environmental Planning and Management*, 1–21 (in press).
- Cheung, L.T.O., & Fok, L. (2014). Assessing the role of ecotourism training in changing participants' pro-environmental knowledge, attitude and behaviour. *Asia Pacific Journal of Tourism Research*, 19(6), 645–661.
- Chou, H. Y., & Lien, N. H. (2012). The effects of incentive types and appeal regulatory framing in travel advertising. *Service Industries Journal*, 32(6), 883–897.
- Coghlan, A., & Carter, L. (2020). Serious games as interpretive tools in complex natural tourist attractions. *Journal of Hospitality and Tourism Management*, 42, 258–265.
- Coghlan, A., & Kim, A.K. (2012). Interpretive layering in nature-based tourism: A simple approach for complex attractions. *Journal of Ecotourism*, 11(3), 173–187.
- Coghlan, A., Ruth Fox, K., Prideaux, B., & Lück, M. (2011). Successful interpretation in great barrier reef tourism: Dive in or keep out of it? *Tourism in Marine Environments*, 7(3-4), 167–178.

- Darke, P.R., Brady, M.K., Benedictus, R.L., & Wilson, A.E. (2016). Feeling close from afar: The role of psychological distance in offsetting distrust in unfamiliar online retailers. *Journal of Retailing*, 92(3), 287-299.
- Delmas, M. A., Fischlein, M., & Asensio, O. I. (2013). Information strategies and energy conservation behavior: A meta-analysis of experimental studies from 1975 to 2012. *Energy Policy*, 61, 729–739.
- Deterding, S. (2015). The lens of intrinsic skill atoms: A method for gameful design. *Human–Computer Interaction*, 30(3-4), 294-335.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining “gamification.” *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments, MindTrek 2011* (pp. 9–15). IEEE Computer Society.
- Dickinson, J. E., Robbins, D., Filimonau, V., Hares, A., & Mika, M. (2013). Awareness of tourism impacts on climate change and the implications for travel practice: A Polish perspective. *Journal of Travel Research*, 52(4), 506-519.
- Dolnicar, S. (2020). Designing for more environmentally friendly tourism. *Annals of Tourism Research*, 84, 102933.
- Dolnicar, S., Lazarevski, K., & Yanamandram, V. (2013). Quality of life and tourism: A conceptual framework and novel segmentation base. *Journal of business research*, 66(6), 724-729.
- Douglas, B. D., & Brauer, M. (2021). Gamification to prevent climate change: A review of games and apps for sustainability. *Current Opinion in Psychology*, 42, 89–94.
- EPA. (2022). Encuesta de población Activa. Retrieved from https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176918&menu=ultiDatos&idp=1254735976595
- Eppmann, R., Bekk, M., & Klein, K. (2018). Gameful Experience in Gamification: Construction and Validation of a Gameful Experience Scale [GAMEX]. *Journal of Interactive Marketing*, 43, 98–115.
- European Union. (2021). *European regional development fund*. Retrieved from https://ec.europa.eu/regional_policy/en/funding/erdf/.
- Fennell, D. A. (2021). Technology and the sustainable tourist in the new age of disruption. *Journal of Sustainable Tourism*, 29(5), 767-773.
- Fernández, G., & Ramos, A. G. (2015). Sustainability in tourism through environmental education applied to itineraries. *Revista de turism-studii si cercetari in turism*, (19), 8–14.
- Frías-Jamilena, D.M., Polo-Peña, A.I., & Rodríguez-Molina, M. A. (2017). The Effect of Value-Creation on Consumer-Based Destination Brand Equity. *Journal of Travel Research*, 56(8), 1011–1031.

- Gössling, S. (2018a). Tourism, tourist learning and sustainability: An exploratory discussion of complexities, problems and opportunities. *Journal of Sustainable Tourism*, 26(2), 292–306.
- Gössling, S. (2018b). ICT and transport behavior: A conceptual review. *International Journal of Sustainable Transportation*, 12(3), 153–164.
- Gössling, S. (2021). Tourism, technology and ICT: A critical review of affordances and concessions. *Journal of Sustainable Tourism*, 29(5), 733–750.
- Gössling, S., & Peeters, P. (2015). Assessing tourism's global environmental impact 1900–2050. *Journal of Sustainable Tourism*, 23(5), 639–659.
- Gössling, S., Scott, D., & Hall, C.M. (2020). Pandemics, tourism and global change: A rapid assessment of COVID-19. *Journal of Sustainable Tourism*, 29(1), 1–20.
- Grazzini, L., Rodrigo, P., Aiello, G., & Viglia, G. (2018). Loss or gain? The role of message framing in hotel guests' recycling behaviour. *Journal of Sustainable Tourism*, 26(11), 1944–1966.
- Hair, J.F., Black, W.C., Babin, B.F., and Anderson, R.E. (2009). *Multivariate data analysis*. Prentice Hall.
- Hall, C. M. (2019). Constructing sustainable tourism development: The 2030 agenda and the managerial ecology of sustainable tourism. *Journal of Sustainable Tourism*, 27(7), 1044-1060.
- Ham, S.H. (1992). *Environmental interpretation: a practical guide for people with big ideas and small budgets*. Colorado: North American Press.
- Hamari, J. (2017). Do badges increase user activity? A field experiment on the effects of gamification. *Computers in Human Behavior*, 71, 469–478.
- Hamari, J., & Koivisto, J. (2014). Measuring flow in gamification: Dispositional Flow Scale-2. *Computers in Human Behavior*, 40, 133–143.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, 52(12), 1280–1300.
- Higgins, E.T., Friedman, R.S., Harlow, R.E., Idson, L.C., Ayduk, O.N., & Taylor, A. (2001). Achievement orientations from subjective histories of success: Promotion pride versus prevention pride. *European Journal of Social Psychology*, 31(1), 3–23.
- Högberg, J., Hamari, J., & Wästlund, E. (2019). Gameful experience questionnaire (GAMEFULQUEST): An instrument for measuring the perceived gamefulness of system use. *User Modeling and User-Adapted Interaction*, 29(3), 619–660.
- Holmqvist, J., Guest, D., & Grönroos, C. (2015). The role of psychological distance in value creation. *Management Decision*, 53(7), 1430–1451.
- Hsu, C. L., Chen, Y. C., Yang, T. N., & Lin, W. K. (2017). Do website features matter in an online gamification context? Focusing on the mediating roles of user experience and attitude. *Telematics and Informatics*, 34(4), 196-205.

- Huotari, K., & Hamari, J. (2012). Defining gamification: A service marketing perspective. In *Proceeding of the 16th international academic MindTrek conference* (pp. 17–22).
- Huotari, K., & Hamari, J. (2017). A definition for gamification: anchoring gamification in the service marketing literature. *Electronic Markets*, 27(1), 21–31.
- Jin, L., & He, Y. (2013). Designing service guarantees with construal fit: Effects of temporal distance on consumer responses to service guarantees. *Journal of Service Research*, 16(2), 202–215.
- Johnson, D., Horton, E., Mulcahy, R., & Foth, M. (2017). Gamification and serious games within the domain of domestic energy consumption: A systematic review. *Renewable and Sustainable Energy Reviews*, 73, 249–264.
- Jones, C., Hine, D. W., & Marks, A. D. (2017). The future is now: Reducing psychological distance to increase public engagement with climate change. *Risk Analysis*, 37(2), 331–341.
- Juvan, E., & Dolnicar, S. (2014). The attitude–behaviour gap in sustainable tourism. *Annals of tourism research*, 48, 76–95.
- Juvan, E., & Dolnicar, S. (2017). Drivers of pro-environmental tourist behaviours are not universal. *Journal of Cleaner Production*, 166, 879–890.
- Kim, A.K.J. (2012). Determinants of tourist behaviour in coastal environmental protection. *Tourism Geographies*, 14(1), 26–49.
- Kim, M. J., & Hall, C. M. (2019). A hedonic motivation model in virtual reality tourism: Comparing visitors and non-visitors. *International Journal of Information Management*, 46, 236–249.
- Kim, M., & Thapa, B. (2018). Perceived value and flow experience: Application in a nature-based tourism context. *Journal of destination marketing & management*, 8, 373–384.
- Kladou, S. & Kehagias, J. (2014). Assessing destination brand equity: An integrated approach. *Journal of Destination Marketing and Management*, 3(1), 2–10.
- Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*, 45, 191–210.
- Kuo, N. T., Chang, K. C., Cheng, Y. S., & Lin, J. C. (2016). Effects of tour guide interpretation and tourist satisfaction on destination loyalty in Taiwan's Kinmen Battlefield Tourism: perceived playfulness and perceived flow as moderators. *Journal of Travel & Tourism Marketing*, 33(sup1), 103–122.
- Leclercq, T., Poncin, I., & Hammedi, W. (2020). Opening the black box of gameful experience: Implications for gamification process design. *Journal of Retailing and Consumer Services*, 52, 101882.

- Lee, A. Y., & Higgins, E. T. (2009). The persuasive power of regulatory fit. *Social Psychology of Consumer Behavior*, 319–333.
- Lee, T. H., Jan, F. H., & Chen, J. C. (2021). Influence analysis of interpretation services on ecotourism behavior for wildlife tourists. *Journal of Sustainable Tourism*, 1–19 (in press).
- Lee, A. Y., Keller, P. A., & Sternthal, B. (2010). Value from regulatory construal fit: The persuasive impact of fit between consumer goals and message concreteness. *Journal of Consumer Research*, 36(5), 735–747.
- Lee, S., & Oh, H. (2014). Effective communication strategies for hotel guests' green behavior. *Cornell Hospitality Quarterly*, 55(1), 52–63.
- Lehman, P. K., & Geller, E. S. (2004). Behavior analysis and environmental protection: Accomplishments and potential for more. *Behavior and Social Issues*, 13(1), 13–32.
- Lerner, E., Streicher, B., Sachs, R., Raue, M., & Frey, D. (2015). The effect of construal level on risk-taking. *European Journal of Social Psychology*, 45(1), 99–109.
- Lieberman, N., & Trope, Y. (2014). Traversing psychological distance. *Trends in Cognitive Sciences*, 18(7), 364–369.
- Lieberman, N., Trope, Y., & Wakslak, C. (2007). Construal level theory and consumer behavior. *Journal of Consumer Psychology*, 17(2), 113–117.
- Lii, Y.S., Wu, K.W., & Ding, M.C. (2013). Doing good does good? Sustainable marketing of CSR and consumer evaluations. *Corporate Social Responsibility and Environmental Management*, 20(1), 15–28.
- Liu, C. H., & Fang, Y. P. (2018). Conceptualizing, validating, and managing brand equity for tourist satisfaction. *Journal of Hospitality & Tourism Research*, 42(6), 960–978.
- Liu, C. R., Wang, Y. C., Huang, W. S., & Tang, W. C. (2019). Festival gamification: Conceptualization and scale development. *Tourism Management*, 74, 370–381.
- Marache-Francisco, C., Brangier, E., & Perseus, E. B. (2013). Process of Gamification. From The Consideration of Gamification To Its Practical Implementation. *Sixth International Conference on Advances in Human Oriented and Personalized Mechanisms, Technologies, and Services*, (September 2015), 126–131.
- Mogilner, C., Aaker, J.L., & Pennington, G.L. (2008). Time will tell: The distant appeal of promotion and imminent appeal of prevention. *Journal of Consumer Research*, 34(5), 670–681.
- Moreno, L., Robina, R., Sánchez-Oro, M., & Castro, J. (2021). Tourism and sustainability in times of COVID-19: The case of Spain. *International Journal of Environmental Research and Public Health*, 18(4), 1859.

- Morschheuser, B., Werder, K., Hamari, J., & Abe, J. (2017). How to gamify? A method for designing gamification. *Proceedings of the Annual Hawaii International Conference on System Sciences*, 1298–1307.
- OMT. (2018). *Panorama OMT del Turismo Internacional, Edición 2018*. Retrieved from <https://www.e-unwto.org/doi/pdf/10.18111/9789284419890>
- OMT. (2019). *Panorama OMT del Turismo Internacional, Edición 2019*. Retrieved from <https://www.e-unwto.org/doi/epdf/10.18111/9789284421237>
- OMT. (2020). *Panorama OMT del Turismo Internacional, Edición 2020*. Retrieved from <https://www.e-unwto.org/doi/epdf/10.18111/9789284422746>
- OMT. (2022a). *One planet vision for a responsible recovery of the tourism sector*. Retrieved from <https://www.unwto.org/es/covid-19-oneplanet-recuperacion-responsable>.
- OMT. (2022b). Barómetro 2022. Retrieved from <https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2022-11/221123-unwto-barometer-november-22-es.pdf?VersionId=rULAKP7BMtycvHYCPZvl86mSoyGxJby>
- Ouariachi, T., Li, C. Y., & Elving, W. J. (2020). Gamification approaches for education and engagement on pro-environmental behaviors: Searching for best practices. *Sustainability*, 12(11), 4565.
- Oviedo-García, M. Á., Castellanos-Verdugo, M., Vega-Vázquez, M., & Orgaz-Agüera, F. (2017). The Mediating roles of the overall perceived value of the ecotourism site and attitudes towards ecotourism in sustainability through the key relationship ecotourism knowledge-ecotourist Satisfaction. *International Journal of Tourism Research*, 19(2), 203-213.
- Pike, S., Bianchi, C., Kerr, G., & Patti, C. (2010). Consumer-based brand equity for Australia as a long-haul tourism destination in an emerging market. *International Marketing Review*, 27(4), 434-449.
- Pike, S., & Page, S.J. (2014). Destination marketing organizations and destination marketing: A narrative analysis of the literature. *Tourism management*, 41, 202-227.
- Polo-Peña, A. I., Frías-Jamilena, D. M., & Rodríguez-Molina, M. A. (2012). The perceived value of the rural tourism stay and its effect on rural tourist behaviour. *Journal of Sustainable Tourism*, 20(8), 1045-1065.
- Polo-Peña, A. I., Frías-Jamilena, D. M., & Rodríguez-Molina, M. A. (2013). The effect of a destination branding strategy for rural tourism on the perceived value of the conservation of the indigenous resources of the rural tourism destination: the case of Spain. *Current Issues in Tourism*, 16(2), 129-147.
- Powell, R.B., & Ham, S.H. (2008). Can ecotourism interpretation really lead to pro-conservation knowledge, attitudes and behaviour? Evidence from the Galapagos Islands. *Journal of Sustainable Tourism*, 16(4), 467-489.

- Powell, R.B., Kellert, S.R., & Ham, S.H. (2009). Interactional theory and the sustainable nature-based tourism experience. *Society and Natural Resources*, 22(8), 761–776.
- Powell, R.B., Vezeau, S.L., Stern, M.J., Moore, D.W.D., & Wright, B.A. (2018). Does interpretation influence elaboration and environmental behaviors? *Environmental Education Research*, 24(6), 875–888.
- Pulido Fernández, J.I. (2004). El medio ambiente en la política turística española. *QPE-Revista Electrónica*, 7(7), 93–114.
- Pulido-Fernández, J. I., Cárdenas-García, P. J., & Espinosa-Pulido, J. A. (2019). Does environmental sustainability contribute to tourism growth? An analysis at the country level. *Journal of Cleaner Production*, 213, 309–319.
- Roberts, M., Mearns, K., & Edwards, V. (2014). Evaluating the effectiveness of guided versus non-guided interpretation in the Kruger National Park, South Africa. *Koedoe*, 56(2), 1–18.
- Robson, K., Plangger, K., Kietzmann, J. H., McCarthy, I., & Pitt, L. (2015). Is it all a game? Understanding the principles of gamification. *Business Horizons*, 58(4), 411–420.
- Schill, M., & Shaw, D. (2016). Recycling today, sustainability tomorrow: Effects of psychological distance on behavioural practice. *European Management Journal*, 34(4), 349–362.
- Scott, D., Hall, C. M., & Gössling, S. (2019). Global tourism vulnerability to climate change. *Annals of Tourism Research*, 77, 49–61.
- Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *International Journal of Human Computer Studies*, 74, 14–31.
- Shin, S., Chung, N., Kang, D., & Koo, C. (2016). How far, how near psychological distance matters in online travel reviews: A test of construal-level theory. *Information and Communication Technologies in Tourism 2016*, 355–368. New York, NY: Springer International Publishing.
- Sigala, M. (2015). The application and impact of gamification funware on trip planning and experiences: the case of TripAdvisor's funware. *Electronic Markets*, 25(3), 189–209.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, 29(3), 309–317.
- Sunyer, J., Dadvand, P., Foraster, M., Gilliland, F., & Nawrot, T. (2021). Environment and the COVID-19 pandemic. *Environmental research*, 195, 110819.
- Tan, E. & Law, R. (2016). mLearning as a softer visitor management approach for sustainable tourism. *Journal of Sustainable Tourism*, 24(1), 132–152.

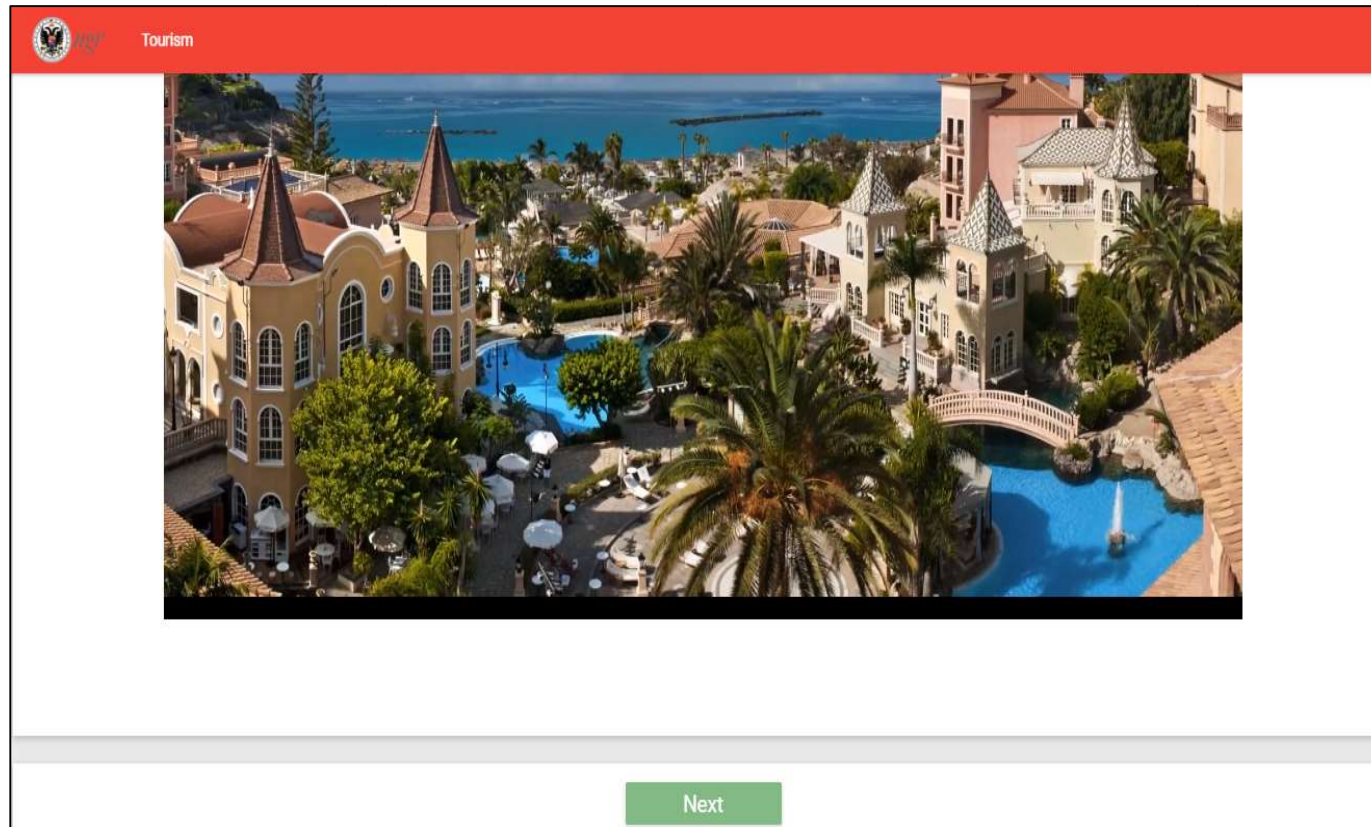
- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, *117*(2), 440-482.
- Trope, Y., Liberman, N., & Wakslak, C. (2007). Construal levels and psychological distance. *Journal of Consumer Psychology*, *17*(2), 83-95.
- Vargo, S. L., & Lusch, R. F. (2014). Evolving to a new dominant logic for marketing. In *The service-dominant logic of marketing*, 21-46.
- White, V., McCrum, G., Blackstock, K.L., & Scott, A. (2006). Indicators and sustainable tourism: Literature review. *The Macaulay Institute*, *15*, 1-21.
- Wicker, P., & Becken, S. (2013). Conscientious vs. ambivalent consumers: Do concerns about energy availability and climate change influence consumer behaviour? *Ecological Economics*, *88*, 41-48.
- Wiener, C.S., Needham, M.D., & Wilkinson, P.F. (2009). Hawaii's real life marine park: Interpretation and impacts of commercial marine tourism in the Hawaiian Islands. *Current Issues in Tourism*, *12*(5-6), 489-504.
- Wolf, I. D., Stricker, H. K., & Hagenloh, G. (2013). Interpretive media that attract park visitors and enhance their experiences: A comparison of modern and traditional tools using GPS tracking and GIS technology. *Tourism Management Perspectives*, *7*, 59-72.
- Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism management*, *60*, 244-256.
- Xu, H., Cui, Q., Ballantyne, R., & Packer, J. (2013). Effective environmental interpretation at Chinese natural attractions: The need for an aesthetic approach. *Journal of Sustainable Tourism*, *21*(1), 117-133.
- Xu, F., Tian, F., Buhalis, D., Weber, J., & Zhang, H. (2016). Tourists as Mobile Gamers: Gamification for Tourism Marketing. *Journal of Travel and Tourism Marketing*, *33*(8), 1124-1142.
- Yoo, B., & Donthu, N. (2001). Developing and validating a multidimensional consumer-based brand equity scale. *Journal of Business Research*, *52*(1), 1-14.
- Zavattaro, S.M., Daspit, J.J., & Adams, F.G. (2015). Assessing managerial methods for evaluating place brand equity: A qualitative investigation. *Tourism Management*, *47*, 11-21.
- Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of marketing*, *52*(3), 2-22.
- Zikmund, W. G. (1998). *Essentials of marketing research*. Harcourt Brace College Publishers.

Anexo I: Estímulo experimental


Interpretación ambiental no gamificada

Video que muestra directrices para lograr la sostenibilidad medioambiental:

<https://www.youtube.com/watch?v=JiOQop7TRwg>



Texto introductorio que habla de España como destino turístico



Process


Next

Brochure


Spain is an all-round destination, with something for everyone. You can visit stunning monuments that attract millions of visitors (such as the Alhambra in Granada or the Sagrada Familia in Barcelona), take a dip in the warm, crystal-clear waters surrounding idyllic islands such as Majorca and Tenerife, and witness some of the most spectacular natural beauty (such as the Doñana National Park or the Picos de Europa mountains). You can watch heart-stopping spectacles such as the 'castells' (human towers) in Catalonia or a flamenco show anywhere in Spain – and let's not forget the gastronomy and popular celebrations, where you can try a paella or join in the world-famous 'Tomatina' tomato-fight festival in Buñol. To support conservation efforts and help avoid the more negative impact of certain activities, it's important to understand the particular problems faced by this destination and what you can do to ensure that the country's natural, social, and cultural resources are properly protected. To achieve this, it's crucial that tourists be encouraged to commit to sustainability, as well as being well-informed about how to stay safe and secure during their visit. If you would like to get involved, please take a look at the following information leaflet, which provides some helpful examples highlighting some of the problems and what you can do to help address them.

Next


Folleto con información turística y consejos sobre cómo contribuir con la sostenibilidad medioambiental

 **Tourism**


Beach




Spain has the highest number of blue-flag beaches in the world – no fewer than 577! The blue flag is an environmental quality standard that certifies, among other factors, **water quality, environmental management, beach security and safety, and services and facilities.** To maintain this leading status, Spain needs the help of its tourist visitors. One way **you can help** is by always **using the rubbish bins** provided and, wherever possible, **separating glass, paper, and plastic.** **Rubbish left on the sand or thrown in the water will contaminate the environment** and, ultimately, make it impossible to guarantee that Spain's beaches can be enjoyed in a healthy and conservation-friendly way.





In TripAdvisor's 2015 Travellers' Choice Beach Awards, Formentera's Ses Illetes was crowned the best beach in Spain, the second-best in Europe, and the fifth-best in the world. It was recognized for its crystal-clear waters and its stunning natural landscape. Despite offering a wide range of leisure facilities – from water sports to restaurants and sun-loungers – **there is very little built development,** leaving visitors to enjoy this natural paradise with nothing to spoil the view. This is not the case with other islands, where **large-scale construction is problematic** for both tourists and locals, causing **excessive noise and large volumes of rubbish.** In this sense, **tourists can make a contribution by choosing those destinations that invest in sustainable development** over those that do not.



Anexo I: Estímulo experimental


 Tourism





Tourists visiting **Spain** will **find iconic hotels** that tell something of the country's history and exude the essence of its customs and culture. But visitors **can also find** hotels that will provide an **exotic experience** that transports them to another world. Staying at a **hotel is a safe and comfortable option** for tourists, but to minimize any negative impact of tourism on the destination it's **important to follow recommendations on sustainable management of water supplies**.

Encouraging clients to get involved in this effort is a highly effective and successful means for hotels to make a contribution. For example, if hotel clients leave their bath tap running unnecessarily, or if they demand their towels and bed linen be changed too often, this **level of water consumption is not sustainable**. And we all know that this will lead to increasing wastage of this vital resource that is in short supply in certain areas.



Next

Tourism

Process

Task

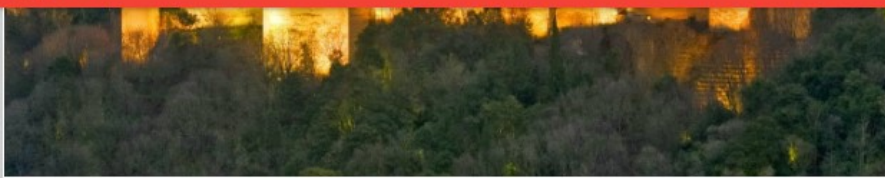
Historical and Cultural heritage

Granada's Alhambra is a **World Heritage** Site and the only remaining palatine city from the Islamic era in the world. It houses, among other treasures, the Palace of Charles V; the Royal Palace; the Comares Palace; the Hall of the Kings; the Hall of the Two Sisters; the Courtyard of the Lions; and the Alcazaba fortification. All these features make the Alhambra **one of the most-visited monuments in the world**. To **ensure its safekeeping** and also the **safety and security of its visitors**, certain **areas have limited access** and visitors have to follow a schedule of timed visits. Were such measures not taken, future generations would not be able to enjoy this unique gem. Again, **tourists can help** by cooperating fully, for example by **respecting the visiting times** noted on their entry ticket.

Anexo I: Estímulo experimental



Tourism




The Basílica de la Sagrada Família (Basilica of the Holy Family) in Barcelona is an **architectural jewel**, crafted by the genius **Antonio Gaudí**. It is a singularly beautiful construction, known for its outstanding colours and use of light. It is considered a major spiritual centre and is **one of the most-visited** monuments in Spain (indeed, in the world). It is the city's emblem and **one of the features that most impresses visitors**. On the downside, tourists find the **noise level in Barcelona the most negative feature**. In the area surrounding the Sagrada Família, noise pollution is excessive, and the **tourists themselves contribute** to the general noise level in the city. If the tourist is not civically-minded and **respectful in their attitude**, for example when visiting **public places**, the noise level will continue to be one of the least favourable aspects of this wonderful city.



The Prado Museum in Madrid is known the world over, and, together with the Thyssen-Bornemisza Museum and the National Reina Sofía Museum, forms the so-called Golden Triangle of Art. Located close by, the three museums, between them, **attract millions of tourists each year**. The Prado houses the best and most extensive collections of painters such as **Velázquez, Goya, and El Bosco**. In addition, it not only employs security measures that **ensure the wellbeing of all its visitors and the safekeeping of its artworks**, but also makes an active **commitment to the environment**. In a pioneering move, it has installed **LED lighting**, which both provides better lighting for the exhibitions and also reduces **CO2 emissions**. **Tourists** can also **contribute** to such environmental initiatives, for example by carefully **choosing the best mode of transport** for their visit. Unsustainable forms of transport increase CO2 emissions (indeed, they are one of the main causes). Tourists can, however, choose to opt for **public transport** or are even recommended to discover the city by **bike**.



Next





Process

Risk

Natural Resources

The Pyrenees, the mountain range in the north of Spain, offers an **extraordinary natural setting**, with its **'ibóns'**- glacial mountain lakes. With around 200 such lakes to choose from, visitors can enjoy a number of sporting activities, including, in particular, ice diving. However, **the Pyrenean 'ibóns' are suffering continual damage** as a result of the **actions of humans**. The rubbish that is discarded around the area, or thrown directly into the water, not only presents a **menace for divers** in terms of potential accidents, but also poses a **serious threat to the ecosystem**. **Safety measures** include a warning not to dive under layers of ice less than 20cm thick, and a request to visitors to take care of this wonderful place and **not leave their rubbish**, as it could be potentially hazardous.





Anexo I: Estímulo experimental



Tourism



The Doñana National Park is Europe's largest area of natural biodiversity. Thanks to its privileged geographical location between two continents, Doñana is home to **over 300 species of birds and 37 species of mammals**, notably the **Iberian lynx** – considered to be **the most at-risk feline species on the planet**. It inhabits the few areas that remain well-conserved and at a safe distance from human activity. Its loss of habitat can be attributed to such catastrophes as forest fires or urban development of the natural environment. Therefore, if visitors to the Park **ignore the recommendations** (for example, if they do not follow the official paths on foot or in specially authorized vehicles), their **safety cannot be guaranteed** and they will be putting the habitat of this unique, beautiful animal at great risk.




Over 25% of Spain is officially protected territory, under the classification system for **National Parks and Nature Parks**. Of the two, National Parks are more strictly protected by law. Here you can find a diverse range of attractive natural features, including glacial lakes, green valleys, leafy glades, and waterfalls. One of the **most popular** such parks is **Timanfaya National Park, in Lanzarote**, where **over 25 volcanoes** are to be found. Visitors must be sure not to miss the volcano route and marvel at the spectacular geysers – but they must always be mindful of the treacherous nature of the Park. **To avoid risk** wherever possible, and **to take good care of this environment**, visitors are recommended to **use only the two official paths designated for walkers**, and to cover the rest of the terrain in the company of **expert guides**, either **on foot or by bus** – or on camelback, even more fun!



Next

Texto llamando a la colaboración para lograr la sostenibilidad medioambiental

 Tourism

Between 18 and 29 years Between 30 and 44 years Between 45 and 64 years Over 65 years

Educational level:

No qualifications Secondary-level qualifications Further Education Degree Postgraduate

Employment status:

In paid work Self-employed Unemployed Student Retired

Predicted budget for your stay at this destination:

Up to £300 £301 - £600 £601 - £900 £901 - £1,200 Over £1,200

Monthly family income:

Less than £600 £600 - £1,200 £1,201 - £1,800 £1,801 - £2,400 £2,401 - £3,000 £3,001 - £4,000 £4,001 - £5,000 Over £5,000


I have spent this holiday:

Alone With my partner With my partner and child/children who is/are under 16. How many children? With my partner and child/children who is/are over 16. How many children?

With my child/children. How many children? With friends With family

Congratulations!

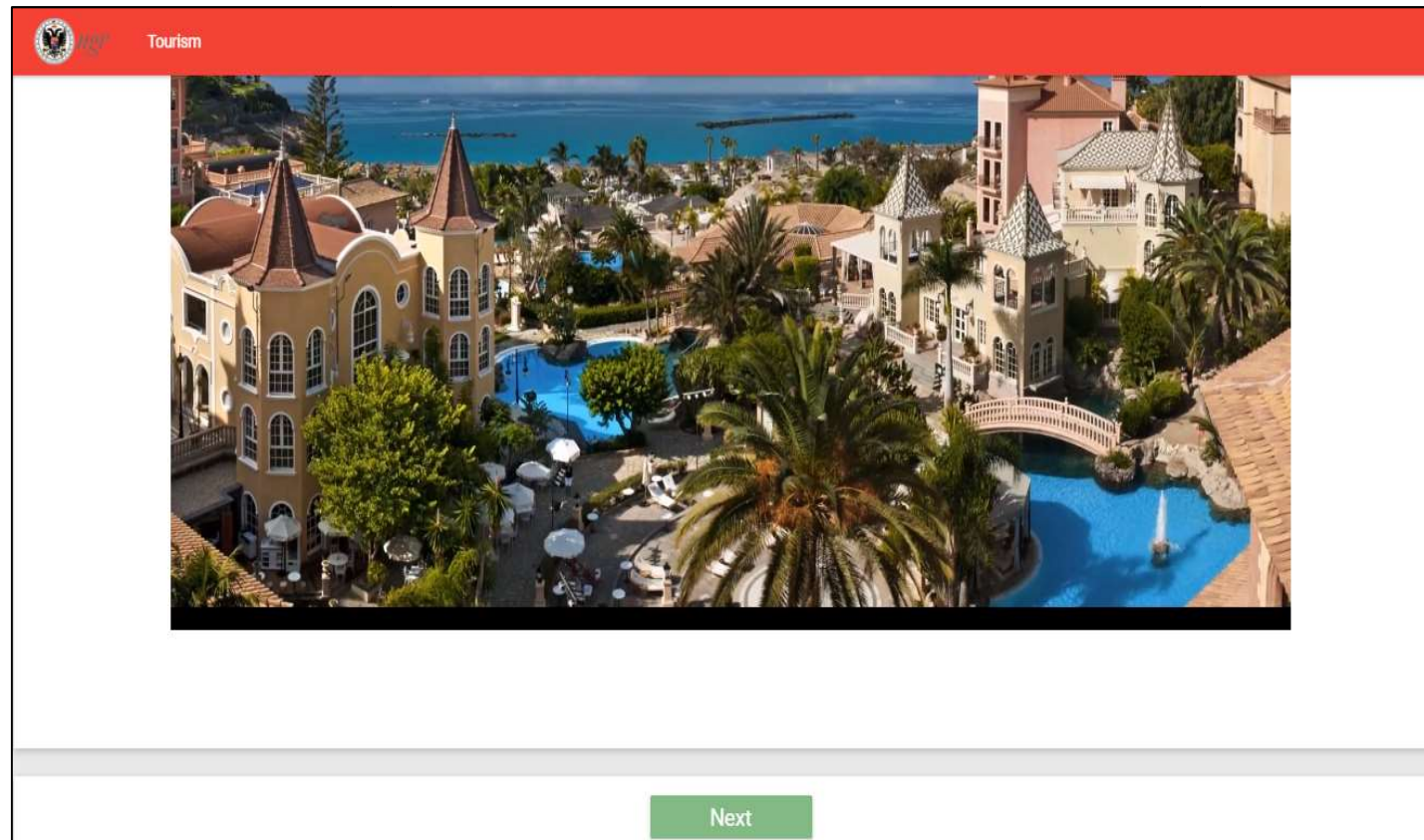
We hope you will collaborate in contributing to the sustainability of this tourist destination. Showing your commitment to the environment as a tourist is entirely in your hands.



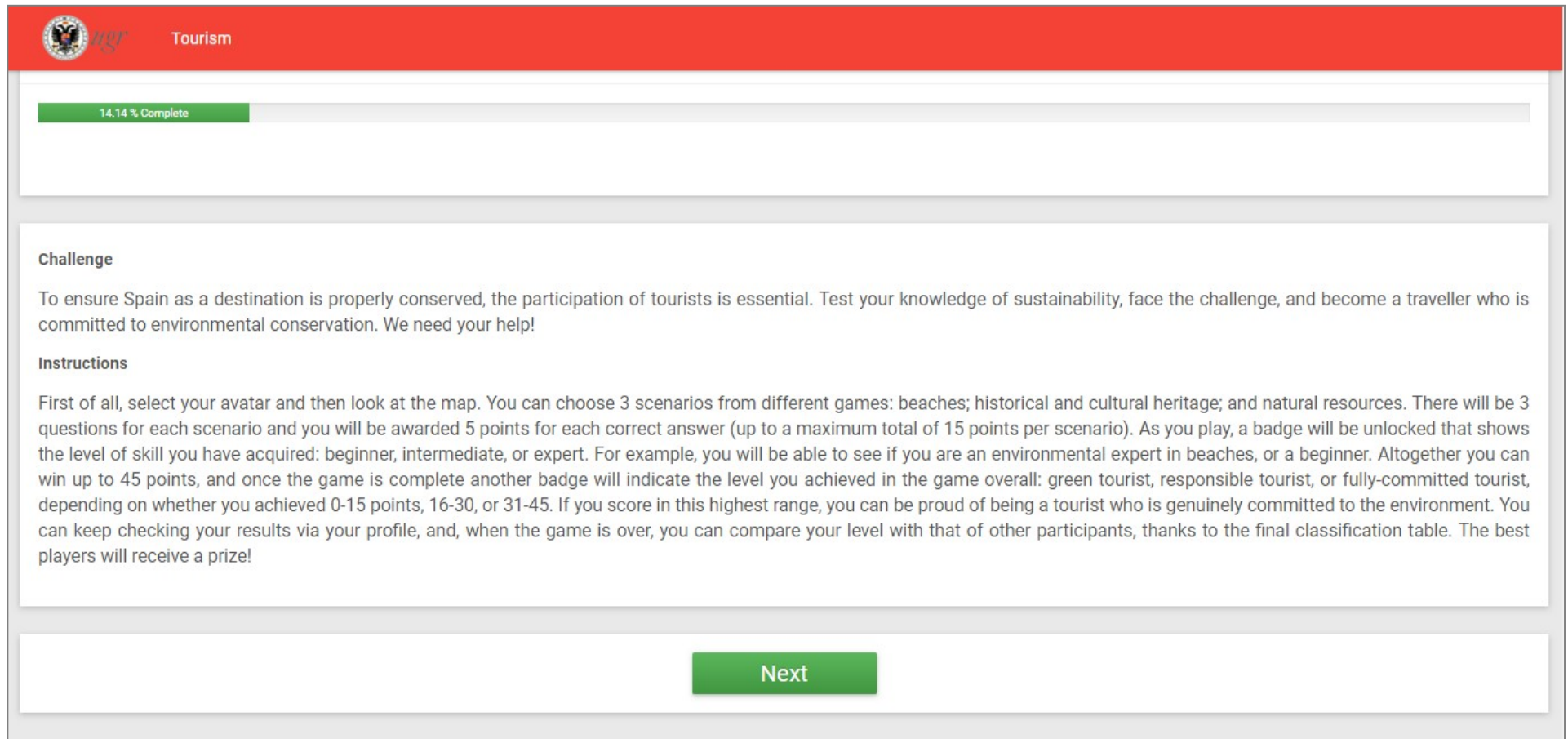
Interpretación ambiental gamificada

Video que muestra directrices para lograr la sostenibilidad medioambiental e incluye un desafío:

<https://www.youtube.com/watch?v=ZPNAppDYGBE>



Texto introductorio que habla de España como destino turístico que incluye un desafío e instrucciones, avatar, mapa de España como destino con distintos escenarios e información del perfil del participante



Challenge

To ensure Spain as a destination is properly conserved, the participation of tourists is essential. Test your knowledge of sustainability, face the challenge, and become a traveller who is committed to environmental conservation. We need your help!

Instructions

First of all, select your avatar and then look at the map. You can choose 3 scenarios from different games: beaches; historical and cultural heritage; and natural resources. There will be 3 questions for each scenario and you will be awarded 5 points for each correct answer (up to a maximum total of 15 points per scenario). As you play, a badge will be unlocked that shows the level of skill you have acquired: beginner, intermediate, or expert. For example, you will be able to see if you are an environmental expert in beaches, or a beginner. Altogether you can win up to 45 points, and once the game is complete another badge will indicate the level you achieved in the game overall: green tourist, responsible tourist, or fully-committed tourist, depending on whether you achieved 0-15 points, 16-30, or 31-45. If you score in this highest range, you can be proud of being a tourist who is genuinely committed to the environment. You can keep checking your results via your profile, and, when the game is over, you can compare your level with that of other participants, thanks to the final classification table. The best players will receive a prize!

Next

Anexo I: Estímulo experimental



 **Tourism**  **Profile**




Select your avatar and move it to one of the scenarios on the map






The map interface features a central orange landmass on a blue background with wavy lines representing water. There are 10 yellow circular icons scattered across the landmass, each containing a different scene: a palm tree on a small island, a group of three trees, a large building with a dome, and a palm tree on a small island. A female avatar with red hair, wearing a green dress and blue shoes, is positioned on the left side of the map, ready to be moved to one of the scenario icons.

Anexo I: Estímulo experimental




 Tourism  Profile

 Beginner  Intermediate  Expert Score: 0

Natural Resources

 Beginner  Intermediate  Expert Score: 10

Historical and Cultural Heritage


 Beginner  Intermediate  Expert Score: 15

Total Score

Leaderboard


User	Score
BRUCE	32
CATHERINE	31
VILMA	26
YOU	25
VLADIMIR	24
BONNIE	21
EVA	17
CORY	15
EVA	4

Anexo I: Estímulo experimental


 **Tourism** Profile

Beginner Intermediate Expert


Historical and Cultural Heritage



Beginner




Intermediate



Expert

Score: 15

Total Score





Total Score: 25
You are a responsible tourist!

[Share](#)

YOU	25
VLADIMIR	24
BONNIE	21
EVA	17
CORY	15
EVA	4

Next

Juego de preguntas y respuestas con información turística y consejos sobre cómo contribuir a la sostenibilidad medioambiental

 **Tourism**  **Profile**

Scores


Beginner Intermediate Expert



Total Score: 0

1 Question

Spain has the highest number of blue-flag beaches in the world – no fewer than 577! The blue flag is an environmental quality standard that certifies, among other factors, water quality, environmental management, beach safety and security, and services and facilities. To maintain this leading status, Spain needs the help of its tourist visitors. One way you can help is by:

- Always using the rubbish bins provided
- Wherever possible, separating glass, paper, and plastic
- Using the rubbish bins provided (but there is no need to separate-out the glass, paper, and plastic items)
- a and b are the correct answers



 **Tourism**  **Profile**

Scores


Beginner Intermediate Expert

Total Score: 0



2 Question


In TripAdvisor's 2015 Travellers' Choice Beach Awards, Formentera's Ses Illetes was crowned the best beach in Spain, the second-best in Europe, and the fifth-best in the world. It was recognized for its crystal-clear waters and its stunning natural landscape. Despite offering a wide range of leisure facilities – from water sports to restaurants and sun-loungers – there is very little built development. This is not the case with other islands, where large-scale construction is problematic for both tourists and locals, causing excessive noise and large volumes of rubbish. How can tourists encourage more sustainable construction?

- By staying only at apartments
- By rewarding those destinations investing in sustainable construction with their business, choosing these destinations for their visit
- Tourists cannot make any such contribution
- None of the above.





Anexo I: Estímulo experimental

TourismProfile


Beginner

Scores


Intermediate



Expert



Total Score: 0

3 Question


Tourists visiting Spain will find iconic hotels that tell something of the country's history and exude the essence of its customs and culture. But visitors can also find hotels that will provide an exotic experience that transports them to another world. Staying at a hotel is a safe and comfortable option for tourists, but to minimize any negative impact of tourism on the destination it's important to follow recommendations on sustainable management of water supplies. Encouraging clients to get involved in this effort is a highly effective and successful means for hotels to make a contribution. How can clients ensure their water consumption is sustainable and avoid wasting water – a vital resource that is in short supply?


- > By turning off the tap when not in use
- > By not demanding their towels be changed unnecessarily
- > By not demanding their bed linen be changed, if not strictly needed
- > All of the above




 **Tourism**  **Profile**

Scores

Beginner 

Intermediate 


Expert 

Total Score: 0



1 Question




Granada's Alhambra is a World Heritage Site and the only remaining palatine city from the Islamic era in the world. It houses, among other treasures, the Palace of Charles V; the Royal Palace; the Comares Palace; the Courtyard of the Lions; and the Alcazaba fortification. All these features make the Alhambra one of the most-visited monuments in the world. What guidelines should be followed in order to ensure its safekeeping and also the safety and security of its visitors, so that future generations can continue to enjoy it?

- > Set a visiting schedule (but without a time limit, once inside)
- > Just place a limit on length of visits
- > The tourist must keep to the timings indicated on their entry ticket
- > Only public bodies can support its conservation



Anexo I: Estímulo experimental

 **Tourism**  **Profile**


 **Beginner**  **Intermediate**  **Expert**

Total Score: 5



2 Question




The Basilica de la Sagrada Familia (Basilica of the Holy Family) in Barcelona is an architectural jewel, crafted by the genius Antonio Gaudí. It is a singularly beautiful construction, known for its outstanding colours and use of light. It is considered a major spiritual centre and is one of the most-visited monuments in Spain (indeed, in the world). It is the city's emblem and one of the features that most impresses visitors. On the downside, tourists find the noise level in Barcelona the most negative feature. In the area surrounding the Sagrada Familia, noise pollution is excessive. Given that the tourists themselves contribute to the general noise level in the city, what can they do to reduce the level and thus help ensure that this issue ceases to attract among the worst ratings?

- Speak quietly during their stay in the city
- Be civically-minded and respectful in their attitude when visiting public places
- Not listen to music
- None of the above



Anexo I: Estímulo experimental

TourismProfile


BeginnerIntermediateExpert

Total Score: 10

3 Question

The Prado Museum in Madrid is known the world over, and, together with the Thyssen-Bornemisza Museum and the National Reina Sofia Museum, forms the so-called Golden Triangle of Art. Located close by, the three museums, between them, attract millions of tourists each year. The Prado houses the best and most extensive collections of painters such as Velázquez, Goya and El Bosco. In addition, it not only employs security measures that ensure the wellbeing of all its visitors and the safekeeping of its artworks, but also makes an active commitment to the environment. In a pioneering move, it has installed LED lighting, which both provides better lighting for the exhibitions and also reduces CO2. How can tourists contribute to this environmental initiative and help reduce CO2 emissions? Bearing in mind that transport is one of the main causes of carbon emissions, tourists could:

- Travel around the city by bike
- Opt for public transport
- Take the bus rather than the car
- All of the above



Tourism

Profile

Beginner

Scores

Intermediate

Expert

Total Score: 0

1 Question

The Pyrenees, the mountain range in the north of Spain, offers an extraordinary natural setting, with its 'ibóns' – glacial mountain lakes. With around 200 such lakes to choose from, visitors can enjoy a number of sporting activities, including in particular ice diving. However, the Pyrenean 'ibóns' are suffering continual damage as a result of the actions of humans – actions that can also cause accidents among divers. To reduce the likelihood of such risk, divers are recommended not to dive under layers of ice less than 20cm thick. But, in addition, to protect the wider ecosystem, what should visitors do?

- > Avoid discarding rubbish in or around the water
- > Use the lakes for fishing
- > a and b are both correct
- > Discarded rubbish poses no threat of danger to divers

Tourism

Profile

Beginner

Scores

Intermediate

Expert



Total Score: 0




2 Question

The Doñana National Park is Europe's largest area of natural biodiversity. It is home to over 300 species of birds and 37 species of mammals, notably the Iberian lynx – considered to be the most at-risk feline species on the planet. It inhabits the few areas that remain well-conserved and at a safe distance from human activity. Its loss of habitat can be attributed to such catastrophes as forest fires or urban development of the natural environment. To avoid putting the habitat of this unique animal at great risk, and to ensure visitor safety, what are the recommendations?

- > Other than not making fires, there are no further measures that need to be taken
- > Visit the park on foot, using the official pathways
- > Visit the park using authorized vehicles belonging to the specialist companies operating there
- > b and c are correct

Anexo I: Estímulo experimental

TourismProfile


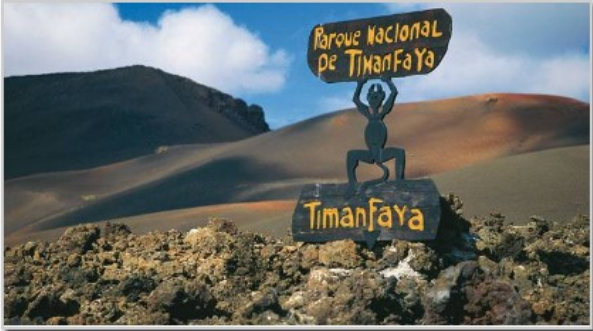
BeginnerIntermediateExpert

Total Score: 5

3 Question

Over 25% of Spain is officially protected territory, under the classification system for National Parks and Nature Parks. Of the two, National Parks are more strictly protected by law. Here you can find a diverse range of attractive natural features, including glacial lakes, green valleys, leafy glades, and waterfalls. One of the most popular such parks is Timanfaya National Park, in Lanzarote, where over 25 volcanoes are to be found. Visitors must be sure not to miss the volcano route and marvel at the spectacular geysers – but they must always be mindful of the treacherous nature of the Park. To avoid risk wherever possible, and to take good care of this environment, visitors are recommended to explore the Park:

- > In the company of expert guides
- > Using the official paths
- > By camel, on trips organized by specialist companies
- > All the above



Texto llamando a colaborar para conseguir la sostenibilidad medioambiental, felicitando al participante por completar el desafío y ofreciéndole que comparta su logro en facebook así como un regalo por haber participado


Congratulations, you completed the game!

Congratulations! You completed the game! Showing your commitment to the environment as a tourist is entirely in your hands.

Follow the link to get your prize!! [Click here.](#)

Please after downloading the guide, finish the survey on this page so you could be redirected to your panel's points page, thanks

Finalize



Total Score: 45
You are a fully-committed tourist!

[Share](#)

Anexo II: Cuestionario

Estudio exploratorio y pretest para la validación de la escala de experiencia *gameful*

Artículo	Variable y fuente	Indicador	Item cuestionario
Artículo 1	Autonomy (IMI, 1994; Lieberoth, 2015)	AUT1	I didn't feel obliged to do the activities and challenges set for me by this smartband.
		AUT2	I did the activities and challenges set for me by this smartband because I wanted to.
		AUT3	I think this smartband gives me options for different activities and challenges I can do.
Artículo 1	Competence (IMI, 1994; Lieberoth, 2015)	COM1	I'm satisfied with my performance in the activities set for me by this smartband.
		COM2	I was very good at the activities set for me by this smartband.
		COM3	I was very skillful in the activities set for me by this smartband.
Artículo 1	Relatedness (IMI, 1994; Lieberoth, 2015)	REL1	I would like to have the opportunity to interact more often with other users of this smartband.
		REL2	Other users of this smartband and I would probably become friends if we were to interact a lot.
		REL3	I feel close to other users of this smartband.
Artículo 1	Enjoyment (Hamari & Koivisto, 2015b; Van der Heijden, 2004)	ENJ1	This smartband is original
		ENJ2	This smartband is imaginative

Anexo II: Cuestionario

		ENJ3	This smartband is unusual
		ENJ4	This smartband is creative
		ENJ5	This smartband is flexible
Artículo 1	Perceived self-efficacy (Jones, 1986)	EFF1	Using this smartband empowers me to feel more confident in my capacity to practice sports.
		EFF2	Using this smartband empowers me to feel self-assured in terms of my capabilities in sporting activities.
		EFF3	Using this smartband empowers me to master the necessary skills to perform sporting activities

Efectos de la interpretación ambiental gamificada y de la distancia psicológica en el valor percibido, el capital de marca y el comportamiento proambiental. Efecto moderador de la distancia psicológica.

Artículo	Variable y fuente	Indicador	Item cuestionario
Artículo 2, 3 y 4	Prior destination image (Beerli & Martín, 2004; Frías-Jamilena et al., 2008)	IMAP1	In general, the opinion I have of Spain is: Bad--Good
		IMAP2	In general, the opinion I have of Spain is: Unfavorable--Favorable
		IMAP3	In general, the opinion I have of Spain is: Negative--Positive
		IMAP4	In general, the opinion I have of Spain is that: I don't like it--I like it

Anexo II: Cuestionario

Artículo 2, 3 y 4	Environmental concern (Chang et al., 2015 ; Kim & Choi, 2005)	ENVC1	I am extremely worried about the state of the world's environment and what it will mean for my future
		ENVC2	Mankind is severely abusing the environment
		ENVC3	When humans interfere with nature, it often produces disastrous consequences
		ENVC4	The balance of nature is very delicate and easily upset
		ENVC5	Humans must live in harmony with nature in order to survive
Artículo 2, 3 y 4	Subjective norms (Hamari & Koivisto 2015b)	SUBN1	People who influence my attitudes would recommend treating the environment with respect when I visit a different country
		SUBN2	People who are important to me would think positively of me if I were to treat the environment with respect when I visit a different country
		SUBN3	People whom I appreciate would encourage me to treat the environment with respect when I visit a different country
		SUBN4	My friends would think my treating the environment with respect when visiting a different country is a good idea
Artículo 3 y 4	Psychological distance (Chang et al., 2015 ; Nenkov, 2012)	CDESP1	I felt that the environmental awareness program for visitors was referring to: A place far from home--A place close to home
		CDESP2	I felt like I would be traveling to: A place far from home--A place close to home

Anexo II: Cuestionario

		CDTEM1	I felt that the environmental awareness program for visitors would be relevant to me: In the distant future--In the near future
		CDTEM2	I felt that I would take the trip: In the distant future--In the near future
		CDSOC1	I felt that the environmental awareness program for visitors: Had nothing to do with me--Had everything to do with me
		CDSOC2	I felt that the trip: Would be undertaken by someone else-- Would be undertaken by me
Artículo 2, 3 y 4	Autonomy (IMI, 1994; Lieberoth, 2015)	AUT1	I felt that I was doing this activity because I wanted to
		AUT2	I believe I had some choice about doing this activity
		AUT3	I felt like it was my own choice to do this activity
Artículo 2, 3 y 4	Competence (IMI, 1994; Lieberoth, 2015)	COM1	I think I am pretty good at this activity
		COM2	I think I did pretty well at this activity, compared to other participants
		COM3	After working on this activity for a while, I felt pretty competent
		COM4	I am satisfied with my performance in this task
		COM5	I was pretty skilled at this activity

Anexo II: Cuestionario

Artículo 2, 3 y 4	Relatedness (IMI, 1994; Lieberoth, 2015)	REL1	I had the opportunity to compete and interact with others
		REL2	I felt I had the opportunity to share my experience with others
		REL3	I had the opportunity to share my achievements with others
Artículo 2, 3 y 4	Enjoyment (Hamari & Koivisto, 2015b; Van der Heijden, 2004)	ENJ1	I found the environmental awareness program for visitors enjoyable
		ENJ2	I found the environmental awareness program for visitors pleasant
		ENJ3	I found the environmental awareness program for visitors exciting
		ENJ4	I found the environmental awareness program for visitors interesting
Artículo 2	Perceived value (Frías-Jamilena et al., 2017)	PV1	This destination seems to offer reasonable prices
		PV2	Considering what I would have to spend on this trip, this destination offers realvalue-for-money
		PV3	The costs of visiting this destination look like a bargain compared to the benefits I received
		PV4	This destination seems economical
Artículo 3	Destination brand equity (Frías-Jamilena et al., 2017)	DBE1	It makes sense to choose this destination rather than another one, even if they are similar
		DBE2	Even if there is another destination with the same characteristics, I prefer this one

Anexo II: Cuestionario

		DBE3	Even if there is another destination as good as this one, I still prefer this one
		DBE4	Even if there is another destination, no different from this one, it still seems more intelligent to choose this one
Artículo 4	Pro-environmental learning (Hamari et al., 2016)	PERL1	I felt I learned from the environmental awareness program for visitors
		PERL2	During the environmental awareness program for visitors, my environmental knowledge increased
		PERL3	The environmental awareness program for visitors helped me learn
Artículo 4	Pro-environmental attitude (Ballantyne et al., 2011)	CHAN1	The environmental awareness program for visitors has made me more concerned about the well-being of the environment in general
		CHAN2	I feel more strongly about environmental concerns as a result of the environmental awareness program for visitors
		CHAN3	The environmental awareness program for visitors has made environmental issues more meaningful to me
		CHAN4	I have a better understanding of environmental issues because of the environmental awareness program for visitors
		CHAN5	Some of my beliefs have changed as a result of the environmental awareness program for visitors

Anexo II: Cuestionario

Artículo 4	Pro-environmental behavior (Cheung & Fok, 2014)	PEB1	Now that I have experienced the environmental awareness program for visitors, my lifestyle will change to become more environmentally friendly
		PEB2	Now that I have experienced the environmental awareness program for visitors, I am more concerned with nature and the environment and I will take action to protect it
		PEB3	Now that I have experienced the environmental awareness program for visitors, I will have a preference for environmentally-friendly products and services
		PEB4	Now that I have experienced the environmental awareness program for visitors, I will participate in voluntary work for environmental conservation

