

	Name	Game Element	Behaviour change Theory	Discipline	Year
1	Designing productively negative experiences with serious game mechanics: Qualitative analysis of game-play and game design in a randomized trial	Game genre Adventure narrative	Activity Theory Model of Serious Games	Education	2018
2	Evolutionary game theory based evaluation system of green building scheme design	evolutionary game strategy choices	The evolutionary game theory	Urban	2018
3	The good behaviour game: Maintenance effects	Competition Prizes, awards	Good Behaviour Game (GBG)	Education	2016
4	The Design and Game Mechanic of Combined Game Application Prototype for Learning Social Business	Winner strategy game Setting objectives scenario	N/A	Education	2018
5	A human-like game theory-based controller for automatic lane changing	decision making Scenario exposition Time constraint	game theory-based	Education	2018
6	Gamification design to foster stakeholder engagement and behaviour change: An application to urban freight transport	Participation Rewarding Competition	random utility theory (RUT)	Urban	2018
7	Understanding pivotal experiences in behaviour change for the design of technologies for personal wellbeing	Competition Challenge	Self-Determination Theory	Health	2018
8	Sex differences in the effects of acute stress on behaviour in the ultimatum game	Scenario exposition	N/A	Psychology	2018
9	Bridging behaviour science and gaming theory: Using the Intervention Mapping Protocol to design a serious game against cyberbullying	game Genre Avatars	The Intervention Mapping Protocol (IMP) Transportation Theory, Extended Elaboration Likelihood Model (Social Cognitive Theory) (Flow theory, Identification	Psychology	2016

Name		Game Element	Behaviour change Theory	Discipline	Year
10	Understanding game sessions through provenance	Quests Rewards Challenges Avatars Winning/failure states	N/A	Entertaining	2018
11	Children's emotions and quality of products in participatory game design	Collaboration Levels Feedback	Self-Determination Theory (SDT) control-value theory	Psychology	2017
12	BrainQuest: The use of motivational design theories to create a cognitive training game supporting hot executive function	Avatars Game Genre Rules Rewards Leaderboard Points Time constraints	Cognitive Evaluation Theory Self-Determination Theory' motivational theory	Psychology	2018
13	Preliminary results for an economic exchange game designed to measure of an aspect of antisocial behaviour	Challenges Competition Offer Choice	N/A	Psychology	2016
14	Investigating the impact of a health game on implicit attitudes towards food and food choice behaviour of young adults	Avatar Challenges Feedback Resource acquisition Quests Leaderboard Virtual Goods Levels Clear goals	incentive-sensitization theory A social cognitive theory	Health	2018
15	Serious Game Approach to Water Distribution System Design and Rehabilitation Problems	Role Playing Interactivity Scenario Exposition Competitive	N/A	Health	2017

	Name	Game Element	Behaviour change Theory	Discipline	Year
		Points/scores			
16	Exploring the use of arcade game elements for attitude change: Two studies in the aviation safety domain	Time constraint Challenges Levels Avatars	Protection Motivation Theory	Psychology	2018
17	Design of an mHealth App for the Self-management of Adolescent Type 1 Diabetes: A Pilot Study	Points rewards	behaviour change theory	Health	2012
18	Turning the Classic Snake Mobile Game into a Location-Based Exergame that Encourages Walking	Points Levels Challenge	N/A	Health	2012
19	Assessing Knowledge Retention of an Immersive Serious Game vs. a Traditional Education Method in Aviation Safety	Augmented/Virtual Reality Realism Scenario Exposition	N/A	Education	2015
20	Designing Serious Games for Safety Education: “Learn to Brace” versus Traditional Pictorials for Aircraft Passengers	Avatars Augmented/Virtual Reality Realism Scenario Exposition	Protection Motivation Theory The theory of planned behaviour	Education	2016
21	Flowers or a Robot Army? Encouraging Awareness & Activity with Personal, Mobile Displays	Rewards Clear goals	self-monitoring behaviour	Health	2018
22	Serious games for health: An empirical study of the game “Balance” for teenagers with diabetes mellitus	Game genre Challenge Levels Control Avatar Score/ points	Social learning theory	Health	2011
23	Leveraging Gamification in Demand Dispatch Systems	Points Leaderboards	motivation theory self-determination theory	Management	2012

	Name	Game Element	Behaviour change Theory	Discipline	Year
24	Do badges increase user activity? A field experiment on the effects of gamification	Badges	flow theory the theory of planned behavior Social proof theory social comparison theory	Psychology	2017
25	Fish'n'Steps: Encouraging Physical Activity with an Interactive Computer Game	Rewards leaderboard	N/A	Health	2006
26	Gamifying intelligent environments	Points Feedback Leaderboard	N/A	Climate Change	2011
27	Using Crowdsourcing to Support Pro-Environmental Community Activism	Points Rewards Badges Augmented/ Virtual reality	N/A	Psychology	2013
28	Evaluating success for behavioural change in diabetes via mhealth and gamification: mysugr's keys to retention and patient engagement	Points Challenge Rewards	N/A	Health	2013
29	Development and Testing of a Multidimensional iPhone Pain Assessment Application for Adolescents with Cancer	Badges Rewards	N/A	Health	2013
30	Real-World Persuasion From Virtual-World Campaigns: How Transportation Into Virtual Worlds Moderates In-Game Influence	Avatars Challenge Game Genre Clear Goals	N/A	Transportation	2016
31	Adaptation of graphics and gameplay in fitness games by exploiting motion and physiological sensors	Score/points Challenges Control	N/A	Health	2007
32	Making Cool Choices for sustainability: Testing the effectiveness of a game-based approach to promoting pro-environmental behaviors	Competition Rewards Offer Choice Communication	Self-perception theory	Psychology	2017

	Name	Game Element	Behaviour change Theory	Discipline	Year
33	Specifying and testing the design rationale of social robots for behavior change in children	Collaboration Challenges Winning/failure status	Self-determination theory gaming theory	Health	2017
34	Is experience in multi-genre video game playing accompanied by impulsivity?	role playing Time constraints	N/A	Health	2018
35	GAME-SCORE: Game-based energy-aware cloud scheduler and simulator for computational clouds	Realism Scores/points Elicit Action/Decision	N/A	Energy	2018
36	Gender difference of social behavior in the cooperative- competitive game	Competition Collaboration Rules Communication Avatars Teams	Social Exchange Theory	Psychology	2012
37	iLift: A health behavior change support system for lifting and transfer techniques to prevent lower-back injuries in healthcare	Challenge Rules Competition Rewards Feedback	N/A	Health	2016
38	Effectiveness research on the multi-player evolutionary game of coal-mine safety regulation in China based on system dynamics	Offer choice Feedback	evolutionary game theory	Safety	2019
39	Integrating behavioural change and gamified incentive modelling for stimulating water saving	Feedback Control Points/scores Badges Leadboard	Motivation theory Theory of Planned Behaviour Self-determination theory	Energy	2018
40	Modeling lane-changing behavior in a connected environment: A game theory approach	Realism Control Offer Choice Elicit Action/Decision	Game Theory	Transportation	2015

	Name	Game Element	Behaviour change Theory	Discipline	Year
41	A game theoretic approach for assessing residential energy-efficiency program considering rebound, consumer behavior, and government policies	Elicit Action/Decision Scenario exposition	Game Theory	Energy	2019
42	A decision approach with multiple interactive qualitative objectives for product conceptual schemes based on non-cooperative-cooperative game theory	Elicit Action/Decision Collaboration	Game Theory	Engineering	2018
43	Driving is not a game: Video game experience is associated with risk-taking behaviours in the driving simulator	Scenario exposition Elicit Action/Decision Control	N/A	Simulation	2017
44	Gamification in transport interventions: Another way to improve travel behavioural change	Collaboration Social Rewards	Motivation theory Utility theory	Transportation	2018
45	Body in the interactive game: How interface embodiment affects physical activity and health behavior change	Augmented/Virtual Reality Levels Feedback Avatars	social cognitive theory flow theory	Health	2014
46	The efficacy of the Friendly Attac serious digital game to promote prosocial bystander behavior in cyberbullying among young adolescents: A cluster-randomized controlled trial	Avatars Winning/Failure states Feedback Scenario exposition Realism	Social Cognitive Theory Bystander Intervention Model Self Determination Theory	Psychology	2018
47	The influence of competitive and cooperative video games on behavior during play and friendship quality in adolescence	Control Rewards Point/scores Quest Levels Competition	the theory of Bounded Generalized Reciprocity	Psychology	2019
48	Using gameplay data to examine learning behavior patterns in a serious game	Scenario exposition Challenge Quest Resource acquisition	Game Theory	Education	2017

	Name	Game Element	Behaviour change Theory	Discipline	Year
49	The Celsius Game: An experiential activity on management education simulating the complex challenges for the two-degree climate change target	Offer choice Competition Collaboration Elicit action/discussion Resources acquisition	experiential learning theory	Education	2017
50	Turkish validation of the Game Transfer Phenomena Scale (GTPS): Measuring altered perceptions, automatic mental processes and actions and behaviours associated with playing video games	Realism Avatars Interactions	N/A	Psychology	2017
51	Muscle activation behavior in a swimming exergame: Differences by experience and gaming velocity	Feedback Competitiveness Levels	N/A	Health	2017
52	Modeling Lane-Changing Behavior in a Connected Environment: A Game Theory Approach	Elicit Action/discussion Control Interaction	Game theory	Transportation	2015
53	Gaming for the energy transition. Experimenting and learning in co-designing a serious game prototype	Virtual Goods Gifting Realism Challenge	N/A	Education	2017
54	Does a prosocial decision in video games lead to increased prosocial real-life behavior? The impact of reward and reasoning	Challenge Leaderboard Control Avatars Game Genre Elicit action/decision	Moral Foundation Theory	Psychology	2018
55	Gaming climate change: assessing online climate change games targeting youth produced in Spanish	Rules Feedback Rewards Elicit Action/decision	N/A	Education	2017

	Name	Game Element	Behaviour change Theory	Discipline	Year
56	Does it last? Long-term impacts of an app-based behavior change intervention on household electricity savings in Switzerland	Competitive Collaborative challenging Interaction	Theory of Planned Behavior Social Practice Theory	Energy	2019
57	The role of executive control in young children's serious gaming behavior	Scenario Exposition Quests Scaffolds Control	empirical theory	Psychology	2015
58	Effects of cooperative gaming and avatar customization on subsequent spontaneous helping behavior	Collaboration Competition Avatar Offer Choice	N/A	Psychology	2014
59	Hot under the collar: The impact of heat on game play	Rewards Control Offer choice	N/A	Psychology	2017
60	Putting yourself in someone else's shoes: The impact of a location-based, collaborative role-playing game on behaviour	Role playing Elicit Action/decision Scenario exposition	Theory of Planned Behaviour social cognitive theory	Health	2015
61	Online behavior change detection in computer games	Boss fights Challenges Scenario Exposition Collections	N/A	Psychology	2013
62	Taking control! Structural and behavioural plasticity in response to game-based inhibition training in older adults	Time constraint Collections Feedback Rewards Point/Scores	N/A	Health	2017
63	Extending the theory of planned behavior (TPB) to explain online game playing among Malaysian undergraduate students	Collections Gifts Collaboration Challenge	Theory of planned behavior	Information Systems	2017



Name		Game Element	Behaviour change Theory	Discipline	Year
		Avatars Resources acquisition			
64	With great power comes great responsibility: Superhero primes and expansive poses influence prosocial behavior after a motion-controlled game task	Control Immersion Realism Augmented/Virtual Reality Boss Fights	self-perception theory	Psychology	2017
65	Going out of business: Auction house behavior in the Massively Multi-player Online Game Glitch	Avatars Collection Role playing Leaderboard Scores/points	N/A	Entertainment	2014
66	GameFoundry: Social Gaming Platform for Digital Marketing, User Profiling and Collective Behavior	Rewards Social Badges Leaderboard Levels	N/A	Psychology	2014
67	Personality and behavior in a massively multiplayer online role-playing game	Collections Gifts Collaboration Challenge Avatars Resources acquisition	N/A	Entertainment	2014
68	Reducing disruptive behavior in an urban school cafeteria: An extension of the Good Behavior Game	Teams Point/scores Feedback Rewards	N/A	Psychology	2009
69	Involving people in the building up of smart and sustainable cities: How to influence commuters' behaviors through a mobile app game	Leaderboard Rewards Points/scores Challenge	N/A	Urban	2018

	Name	Game Element	Behaviour change Theory	Discipline	Year
70	Community Game Day: Using an End-of-Life Conversation Game to Encourage Advance Care Planning	Rules Social	N/A	Health	2017
71	An inclusive design approach for developing video games for children with Autism Spectrum Disorder	Interactions Avatars Scaffolds Challenge Immersion	N/A	Health	2017
72	Involving people in the building up of smart and sustainable cities: How to influence commuters' behaviors through a mobile app game	Rewards Points/Scores Challenge Achievements	N/A	Cities	2018
73	The effects of a bike active video game on players' physical activity and motivation	Time constraints Levels Scores/Points Feedback Challenge	N/A	Health	2017
74	Evaluating the impact of a cloud-based serious game on obese people	Rewards Clear goal Levels Leaderboards Avatars Interactions	N/A	Health	2014
75	The role of children's on-task behavior in the prevention of aggressive behavior development and peer rejection: A randomized controlled study of the Good Behavior Game in Belgian elementary classrooms	Rewards Teams Winning/Failure states	N/A	Psychology	2013
76	Mobile game design for the elderly: A study with focus on the motivation to play	Game genre Elicit Direction/ Decision Scores/Points	Flow theory	Psychology	2015

	Name	Game Element	Behaviour change Theory	Discipline	Year
		Quests			
77	Exploring the influence of common game elements on ideation output and motivation	Rewards Scores/Points Competition feedback	gamification theory self-determination theory	Business	2018
78	Phonological Disorders in Children? Design and user experience evaluation of a mobile serious game approach	Levels Elicit action/ decision Points/ Scores Resource Acquisition Virtual Goods Content Unlocking	N/A	Health	2017
79	Them and Us: An indoor pervasive gaming experience	Interactions Points/ Scores Collaboration	game play theory	Entertainment	2013
80	Driven to drive? Investigating the effect of gamification on learner driver behavior, perceived motivation and user experience	Clear goal Feedback Rewards Rules Challenges Elicit Action/ decision strategies	Flow theory	Education	2017
81	Changing children's eating behaviour - A review of experimental research	Rewards Challenge Offer choice	N/A	Health	2017
82	Policy Gaming for Strategy and Change	Teams Challenge Role playing Augmented/virtual Reality	N/A	Planning	2007

	Name	Game Element	Behaviour change Theory	Discipline	Year
83	How feedback boosts motivation and play in a brain-training game	Feedback Avatars	Self Determination Theory Cognitive Evaluation Theory (CET)	Education	2015
84	An alternate reality game for facility resilience (ARGFR)	Augmented/Virtual Reality Feedback Time constraints	N/A	Engineering	2015
85	Design challenges in motivating change for sustainable urban mobility	Feedback Challenge	N/A	Urban	2014
86	Nudging and shoving: Using in-game cues to guide player exertion in exergames	Immersion Feedback Winning/losing states Game genre Avatar Score/Points	The theory of immersion motivation-hygiene theory	Health	2017
87	Dispelling the myth of the socio-emotionally dissatisfied gamer	Competence Immersion Social	Self-Determination Theory (SDT)	Psychology	2014
88	Cognitive enhancement in video game players: The role of video game genre	Game genre role-playing strategy	Signal detection theory	Entertainment	2015
89	Design and Evaluation of a Computer Game to Promote a Healthy Diet for Young Adults	Role-playing Avatars Leaderboards Communication Points/scores	social cognitive theory theory of reasoned action theory of planned behavior	Health	2009
90	Positive impact by design: The Wales Centre for Behaviour Change	Game genre Levels Feedback Challenges Immersion	flow theory dual-process theory	Psychology	2014

	Name	Game Element	Behaviour change Theory	Discipline	Year
91	Performance meets games: considering interaction strategies in game design	role-playing competition Winning/lose states	N/A	Media	2013
92	The rationalization process of online game cheating behaviors	Social Feedback	the active audience theory	Psychology	2018
93	Gamification for Behavior Change: Lessons from Developing a Social, Multiuser, Web-Tablet Based Prevention Game for Youths	Rewards Control Challenges Clear Goal Points/ Scores Teams	Theory of Planned Behavior	Psychology	2013
94	Differential Effectiveness of Interdependent and Dependent Group Contingencies in Reducing Disruptive Classroom Behavior	Rules Teams Winning/lose states Rewards	N/A	Psychology	2016
95	Enhancing User-Game Engagement Through Software Gaming Elements	Avatars Control Levels Competence	Self-determination theory	Information Systems	2014
96	Gaming personality and game dynamics in online discussion instructions	Rewards Leaderboards Challenge	self-determination theory (SDT)	Education	2015
97	The good behaviour game	Winning/losing states Teams	N/A	Psychology	2000
98	Understanding problem solving behavior of 6–8 graders in a debugging game	Challenge Control Rewards	N/A	Education	2017
99	Visual behavior and self-efficacy of game playing: an eye movement analysis	Avatars Leaderboards	N/A	Education	2018

	Name	Game Element	Behaviour change Theory	Discipline	Year
100	Role of user-created programs in online game consumer behavior	role-playing immersion Collaboration	Achievement goal theory	Marketing	2016
101	Design evaluation of digital consumer products using virtual reality-based functional behaviour simulation	immersion Augmented/Virtual Reality	N/A	Engineering	2008
102	The Role Behavioral of Activation and Inhibition in Explaining Adolescents' Game Use and Game Engagement Levels	Competition Rewarding Game genre	the reinforcement sensitivity theory (RST)	Psychology	2017
103	Challenges of designing for sociability to enhance player experience in Massively Multi-player Online Role-playing Games	Rewards Communication Social Role Playing	N/A	Psychology	2013
104	Contributions of Game Genre and Masculinity Ideologies to Associations Between Video Game Play and Men's Risk-Taking Behavior	game genre Control	N/A	Psychology	2018
105	What Is Good Can Also Be Bad: The Prosocial and Antisocial In-Game Behaviors of Young Video Game Players	Game genre Teams Collaboration Communication	social-cognitive theories	Psychology	2013
106	Gamification for Behavior Change: Lessons from Developing a Social, Multiuser, Web-Tablet Based Prevention Game for Youths	Offer choice Teams Challenge Points/Scores Elicit Action/Decision competition	the Theory of Planned Behavior	Psychology	2013
107	Gaming personality and game dynamics in online discussion instructions	Rewards Feedback Badges Levels Points/Scores	self-determination theory (SDT)	Education	2015

	Name	Game Element	Behaviour change Theory	Discipline	Year
108	Maximising Gain for Minimal Pain: Utilising Natural Game Mechanics	Feedback Scores/Points Competition Challenge Levels Quest	N/A	Education	2013
109	Coping with [R]evolution in Online Games: Vulnerability and Resilience Responses to Change in MMO Game Expansions	Avatar Communication Quests	N/A	Entertainment	2018
110	Gamestar Mechanic: learning a designer mindset through communicational competence with the language of games	Role-playing Avatar Clear Goal Scaffold Feedback Rewards	N/A	Education	2010
111	The game mechanics of pervasive applications: visiting the uncanny	Game Genre Scores/Points Resources acquisition	N/A	Entertainment	2012
112	Uncanny Gaming The Ravenhearst video games and gothic appropriation	Game Genres Challenges Elicit action/decision	N/A	Media	2015
113	Using game mechanics for field evaluation of prototype social applications: a novel methodology	Challenges Feedback Clear Goals Social	N/A	Psychology	2016
114	Developing a Brief Sensation Seeking Scale for Children: Establishing Concurrent Validity With Video Game Use and Rule-Breaking Behavior	Strategy role playing game genres Rules Rewards	N/A	Psychology	2011

	Name	Game Element	Behaviour change Theory	Discipline	Year
115	Does educational gamification improve students' motivation? If so, which game elements work best?	Points/Scores Leaderboards Unlocking content Gifting	Self-determination theory	Education	2018
116	The queer case of video games: orgasms, Heteronormativity, and video game narrative	Quests role-playing	narrative theory	Psychology	2016
117	Playing with Process: Video Game Choice as a Model of Behavior	Offer Choice Strategy Challenge Role playing Elicit Action/Decision Rewards	N/A	Psychology	2010
118	Can serious games help to mitigate climate change? Exploring their influence on Spanish and American teenagers' attitudes	Elicit Action/decision Immersion Challenges feedback	A theory of planned behavior	Psychology	2018
119	Marketing, Technology, and Medicine: Recommendations on How to Incorporate Psychological Principles into New Technologies to Promote Healthy Behaviors	Competition Challenge Rewards Levels	N/A	Health	2014
120	Entrepreneurial Decision Making in a Dynamic Environment	Elicit action/ decision Virtual goods Feedback	N/A	Business	2006
121	'Gamification': Influencing health behaviours with games	Strategy Points/scores Elicit Action/decision rewards	N/A	Health	2013
122	Developing Games for Health Behavior Change: Getting Started	role playing Resource acquisition Rules Points/scores	health behavior theory action theory	Health	2013



Name		Game Element	Behaviour change Theory	Discipline	Year
		competence			
123	Social motivations to use gamification: an Empirical study of gamifying exercise	Feedback Rewards Achievements Levels	theory of planned behaviour (TPB)	Information Systems	2013
124	Towards personalised, gamified systems: an investigation into game design, personality and player typologies	Challenge Leader boards Points Quests Levels Reward Achievements Winning/failure status	self-determination theory	Psychology	2013
125	Taking The Game Out Of Gamification	Points Badges Levels Virtual resources Rewards	N/A	Management	2013
126	Encouraging User Behaviour with Achievements: An Empirical Study	Badges Rewards Scores/Points Achievements Clear goal	N/A	Information Systems	2013
127	Climate change games as tools for education and engagement	Clear goals rules Avatars Feedback Teams Role Playing	A self-determination theory	Climate Change	2015

	Name	Game Element	Behaviour change Theory	Discipline	Year
128	Intervening to change behaviour and save energy in the workplace: A systematic review of available evidence	Feedback Rewards Competition Social	Theory of Planned Behaviour (TPB)	Energy	2016
129	Keeping up with the joneses: examining community-level collaborative and competitive game mechanics to enhance household electricity-saving behaviour	Points/ Scores Rewards Teams Challenges Badges Feedback	social proof theory	Energy	2016
130	Why do you play World of Warcraft? An in-depth exploration of self-reported motivations to play online and in-game behaviours in the virtual world of Azeroth	Challenge Role play Achievements Rewards Quests Avatars	N/A	Psychology	2013
131	Practical, Appropriate, Empirically-Validated Guidelines for Designing Educational Games	Feedback Clear goal Offer choice Elicit action/decision Achievements Rewards	Fun theory	Education	2011
132	The development approach of a pedagogically-driven serious game to support Relationship and Sex Education (RSE) within a classroom setting	Levels Rewards Feedback Role Playing Competition Realism Discovery	Theory of Planned Behaviour (TPB)	Education	2013
133	Level Up Your Strategy: Towards a Descriptive Framework for Meaningful Enterprise Gamification	Challenges Elicit action/decision	A self-determination theory	Technology	2015

	Name	Game Element	Behaviour change Theory	Discipline	Year
		Collaboration Rules Offer choices Rewards	Fun theory		
134	The Kaleidoscope of Effective Gamification: Deconstructing Gamification in Business Applications	Challenges Elicit actions/decision Achievements	Self-determination theory	Business	2013
135	Serious fun with computer games	Immersive Challenge Rules	Theory of Fun	Entertainment	2010
136	Playful Mobility Choices: Motivating informed mobility decision making by applying game mechanics	Rewards Winning/failure status Offer choice Competence Leader boards Quests Social Collaboration	self-determination theory	Climate change	2014
137	Gamification and Education: A Literature Review	Points/Scores Levels Badges rewards	N/A	Education	2014
138	Playing for Real Video Games and Stories for Health-Related Behavior Change	Immersion Challenges Clear goal Reward Elicit action/decision	social cognitive theory (SCT)	Health	2008
139	Gamifying Behaviour that Leads to Learning	Competitions Rewards Clear goals Challenges	Theory of Motivation self-determination theory (SDT)	Education	2013

Name		Game Element	Behaviour change Theory	Discipline	Year
		Offer choices Points/ Scores			
140	Eudaimonic Design, or: Six Invitations to Rethink Gamification	goals rules feedback challenges competition badges	Self-Determination Theory	Game	2014
141	The potential for using gamification in academic libraries in order to increase student engagement and achievement	Achievement Levels Interactions Social Points/Scores badges	N/A	Education	2014
142	Computer games to teach hygiene: an evaluation of the e-Bug junior game	collaborative Social Quests Rules level	N/A	Education	2011
143	Gamification in business and education – project of gamified course for university students	Feedback Achievements Score/points Badges Leaderboard Challenges	N/A	Education	2014
144	Voluntary Pupil Size Change as Control in Eyes Only Interaction	Feedback role playing	N/A	Health	2008
145	A trace-based approach to identifying users' engagement and qualifying their engaged-behaviours in interactive systems: application to a social game	Challenges Competence Elicit decision/Action	Self-Determination Theory	Psychology	2014

Name		Game Element	Behaviour change Theory	Discipline	Year
		Clear goals rules	Activity Theory and Trace Theory		
146	Playful Mobility Choices: Motivating informed mobility decision making by applying game mechanics	Feedback Clear goal	N/A	Climate change	2014
147	Learning principles and interaction design for 'Green My Place': A massively multiplayer serious game	Achievement Feedback comparative Score/points	N/A	Energy	2011
148	Practical Application of the Learning Mechanics– Game Mechanics (LM-GM) framework for Serious Games Analysis in Engineering Education	Feedback Competition Clear goal Elicit Action/decision Levels Rewards	N/A	Education	2016
149	Skill-based differences in spatio-temporal team behaviour in defence of the Ancients 2 (DotA 2)	Challenging Game genre Competitive Avatars Winning/failure status	N/A	Psychology	2014
150	Gameful Design in the Automotive Domain – Review, Outlook and Challenges	Challenges Rewards clear goal Elicit action/decision Feedback Rules	Fun theory	Automotive	2013
151	Digital and social media opportunities for dietary behaviour change	Challenges Rewards Achievements Interactions competitiveness	Social cognitive theory	Health	2015

	Name	Game Element	Behaviour change Theory	Discipline	Year
152	Gaming to Master the game-game usability and game mechanics	Avatar Scenario exposition	N/A	Entertainment	2014
153	Adapting Game Mechanics with Micro-Machinations	Challenges Feedback Collaboration Rules Clear Goal interaction	N/A	Entertainment	2014
154	Games Just Wanna Have Fun...Or Do They? Measuring The Effectiveness of Persuasive Games	Time constraints Virtual Goods Scores/Points	N/A	Psychology	2007
155	Gamifying information systems – a synthesis of gamification mechanics and dynamics	Challenges Rewards Points/scores Leader boards Levels	Self-determination theory	Information systems	2014
156	Saving energy in an office environment: A serious game intervention	Feedback Rewards Virtual Goods	Self-determination theory	Energy	2014
157	Towards a trans-disciplinary methodology for a game-based intervention development process	Challenges Collaboration Scaffolds Immersion Social Competition rules	N/A	Education	2017
158	Towards a Video Game Description Language	Avatars Rules Avatars Scores/Points	N/A	Entertainment	2013

	Name	Game Element	Behaviour change Theory	Discipline	Year
159	Game Mechanics supporting pervasive learning and experience in Games, Serious Games, and Interactive & Social Media	Role Playing Interaction Elicit Actions/Decisions	N/A	Education	2015
160	Towards evolutionary game models of financial markets	Competitive Interactions Elicit Actions/decisions	Evolutionary game theory	Business	2001
161	Students' behaviour playing an online information literacy game	Rewards Feedback Points/scores badges levels	N/A	Education	2001
162	How Gamification Applies for Educational Purpose Specially with College Algebra	Scaffolding Competition Feedback Badges Levels Clear goal Achievements Scores/ Points	N/A	Education	2014
163	Gamification is all about fun: the role of incentive type and community collaboration	Collaboration Points Badges Leaderboards Rewards Levels Quests challenges	Self Determination Theory (SDT) Goal Contents Theory (GCT)	Psychology	2014
164	The Maturing of Gamification Research	points badges levels leaderboards	Self-Determination Theory	Psychology	2017

	Name	Game Element	Behaviour change Theory	Discipline	Year
		Clear goal			
165	Engineering design using game-enhanced CAD: The potential to augment the user experience with game elements	Challenges Immersion Feedback rewards. Curiosity Game Genre	A theory of fun	Engineering	2013
166	IgnitePlay: Encouraging and Sustaining Healthy living through Social Games	Challenges Competition 'leader boards Clear goals levels	N/A	Entertainment	2011
167	A Case Study in the Gamification of a University-level Games Development Course	Reward Feedback role-playing Points/Scores Offer choice Badges Leaderboards	N/A	Education	2013
168	LEY! Persuasive Pervasive Gaming on Domestic Energy Consumption-Awareness	Scores/points Levels Challenge feedback	N/A	Energy	2011
169	Framework for Designing and Evaluating Game Achievements	Achievements Rewards Challenge Badges Points/scores Elicit Action/Decision	N/A	Entertainment	2011



	Name	Game Element	Behaviour change Theory	Discipline	Year
170	Evaluation of object-oriented design patterns in game development	Rules Points	N/A	Engineering	2007
171	A multiplayer case based story engine	Avatar Levels Clear goal Offer choice	N/A	Entertainment	2003
172	Time's Up: Studying Leaderboards For Engaging Punctual Behaviour	Leaderboards Scores Collaboration Levels competence	Self-determination theory	Psychology	2013
173	Pervasive Serious Gaming for Behavior Change – The State of Play	Feedback Challenge Rewards Competition Elicit Action/ decision	N/A	Psychology	2013
174	Gamification: What It Is and Why It Matters to Digital Health Behavior Change Developers	clear goals feedback rewards badges achievements	self-regulation theory	Health	2013
175	Strategies for Effective Digital Games Development and Implementation	Role Playing Collaborations Points/Scores Levels Feedback Realism Rewards	Game theory	Learning	2013
176	Prosocial behaviour in avatar-mediated interaction: the influence of character gender on material versus emotional help-giving	Interaction Avatar virtual goods	N/A	Psychology	2011

Name		Game Element	Behaviour change Theory	Discipline	Year
177	Narrative Game Mechanics	Interaction Rules Immersive Offer Choices level	N/A	Entertainment	2016
178	Open Data, Crowdsourcing and Game Mechanics. A case study on civic participation in the digital age	Competence Leaderboard feedback	Self-Determination Theory (SDT)	Journalism	2016
179	I Mean It! Detecting User Intentions to create Believable Behaviour for Virtual Agents in Games	Avatar role-playing interaction	N/A	Psychology	2010
180	Knowledge Management using Gamification	Rewards Challenges leader board points badges	N/A	Education	2016
181	Gamification and Human Resources: an overview	Challenges Quests Feedback Points rewards	N/A	Business	2015
182	Exploring Gamification Techniques and Applications for Sustainable Tourism	Social Feedback Competition Levels Badges	N/A	Tourism	2015
183	Gamified physical activation of young men – a Multidisciplinary Population-Based Randomized Controlled Trial (MOPO study)	Rewards Feedback Avatar achievements	N/A	Health	2013

	Name	Game Element	Behaviour change Theory	Discipline	Year
184	Gamification: using gaming mechanics to promote a business	Levels Challenge Immersive Achievement points	N/A	Business	2014
185	The Effects of Embodied Persuasive Games on Player Attitudes Toward People Using Wheelchairs	Challenges Interaction Time constraint	Self-Perception Theory	Health	2014
186	Game, Not Fight: Change Climate Change!	Interaction Role-play Rules feedback	Theory of Gaming	climate change	2013
187	Gamification: a systematic review of design frameworks	Competition Levels Points Challenges Rules time Constraints communication Teams	Game Theory Self Determination Theory (SDT)	Education	2017
188	Gamification patterns for gamification applications	Competition Rules Points Collaborations Badge	N/A	Information systems	2014
189	A Haptic-Based Virtual Reality Head and Neck Model for Dental Education	Virtual Reality Interactive Feedback Immersive challenging	N/A	Heath	2014

	Name	Game Element	Behaviour change Theory	Discipline	Year
190	Serious games as new educational tools: how effective are they? A meta-analysis of recent studies	Virtual Immersion Challenge	the Flow Theory	health	2013
191	The Changing Dynamic of Social Interaction in World of Warcraft: The Impacts of Game Feature Change.	badge rewards competition Collaboration Avatar Role play	N/A	Psychology	2008
192	Enhancing workplace motivation through gamification: Transferrable lessons from pedagogy	Achievement Challenge Competence leader-boards badges points avatars Quests	cognitive evaluation theory Self-Determination Theory (SDT) Four-Drives theory of motivation	Education	2016
193	An inquiry into gamification services: Practices, experiences and insights	Competition Points Levels Leaderboard Challenge Teams Rewards Feedback	Self-Determination Theory (SDT)	Business	2015
194	Psychological Perspectives on Motivation through Gamification	Trait Achievement Competence Points Badges Leaderboards	Self-Determination Theory (SDT)	Psychology	2013

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		Quests Clear goals			
195	Understanding Exergame Users' Physical Activity, Motivation and Behavior Over Time	Levels Clear Goal Virtual Goods Points	social cognitive theory self-efficacy theory	Health	2013
196	Correlation between videogame mechanics and executive functions through EEG analysis	Game Genre Elicit action/ decision Feedback	N/A	Health	2016
197	Effects of Reactive and Strategic Game Mechanics in Motion-based Games	Reward Challenges Immersion Levels Feedback Strategy	Self-Determination Theory (SDT)	Health	2017
198	The Interactive Minority Game: a Web-based investigation of human market interactions	Elicit Action/ Decision Points Interaction	N/A	Games	2004
199	Game Mechanics to Further Engagement with Physical Activity	Challenges Feedback Points	Self-determination Theory	Health	2018
200	Mapping learning and game mechanics for serious games analysis: Mapping learning and game mechanics	Goals Elicit action/ decision Strategies Interactions Avatars	N/A	Education	2015
201	Game mechanics' effects on user retention	Achievements Leaderboards Elicit action/ decision Points Levels	N/A	Entertainment	2017

	Name	Game Element	Behaviour change Theory	Discipline	Year
		Badges			
202	Gamification: Using Gaming Mechanics to promote a business	Rewarding Points Achievement Leaderboards	Theory of Flow	Business	2014
203	Designing productively negative experiences with serious game mechanics: Qualitative analysis of game-play and game design in a randomized trial	role-playing strategy game genre reward Challenges	Activity Theory Model of Serious Games (ATMSG)	Psychology	2018
204	Complex behaviour in a production- distribution model	Elicit Action/ Decision Feedback Collaboration Competition	N/A	Psychology	1999
205	Exploring Engaging Gamification Mechanics in Massive Online Open Courses	Badges Rewards Elicit action/ decision Competition Clear goal Time constraints	N/A	Education	2016