	A Systematic Literature Review of Empirical Evidence on Computer Games and Serious Games
Qualitative or Quantitative?	Quantitative.
Primary or Secondary?	Secondary.
What methodology is utilised?	Meta-analysis of databases, search terms, and selection of papers.
What is the research design?	Data collection by searching through databases with specific keywords, and selecting papers which match those keywords, including an abstract and participants over 14 years old. Data analysis by using a data extraction proforma to categorise games and their outcomes and impacts. Then the quality of papers were read and rated, and assessed how much they related to the research questions.
Empirical or Discussion?	Empirical.
Are there participants? How many?	No participants.
What are the research questions?	1. Empirical evidence on impacts and outcomes of games. 2. Categorising games and their impacts and outcomes.
What are the results?	The paper looked at the effects of using entertainment games and serious games for education, and its domino effect on knowledge acquisition, perceptual and cognitive skills, motor, soft, and social skills, and monitored any behaviour change along with physiological outcomes. Many papers reported that students enjoyed the game-based approach or found it motivating to help their knowledge acquisition and expanded their content understanding.
What are the limitations?	The data collection and analysis were limited by the search terms used, and time period of papers published. An average view of what is good for children in terms of engagement and learning, applies to most, but other outcomes may apply to other children.
What analysis techniques are used?	Graphs were used to visually represent data and tables were used to format and summarise results, and show what the papers analysed had in terms of aims/objectives of the study, methods used, and conclusions.

Was a control group utilised?	No.
Reference	Connolly, T.M., Boyle, E. A., MacArthur, E., Hainey, T., Boyle, J. (2012) A Systematic Literature Review of Empirical Evidence on Computer Games and Serious Games. ScienceDirect. Vol 59 (2), p. 661-686.

	Applying a Phenomenological Approach to Games Analysis: A Case Study
Qualitative or Quantitative?	Qualitative.
Primary or Secondary?	Primary.
What methodology is utilised?	Case Study.
What is the research design?	Post Test.
Empirical or Discussion?	Empirical.
Are there participants? How many?	Two studies. Study 1: 12 participants. Study 2: 13 participants.
What are the research questions?	Initial research questions: 1) What are the factors affecting engagement in multimedia CD-ROM games? 2) Can assessment criteria of benefit to game designers be drawn from the answer to Question 1? After results analyzed and reported: 3) Which aspects of narrative are being invoked in narrative games and what are operational or empirical definitions. Or examples, of their existence?
What are the results?	Players' experiences were reported and analyzed in response to the games played, and a deconstruction and reconstruction process was built and used to construct better games and improve on how players can enjoy playing games.
What are the limitations?	The number of players playing, the number of games played, and the player's own personal feedback can vary to other players.

	With the time involved, a small net was cast over a small number of people's personal experience which may not apply to the rest of the players who play the game.
What analysis techniques are used?	Deconstruction tables were used to format the participant's referent, reason, solution, and proposition. There were also auditory extracts user unitary statements from recorded group discussions which express the participant's feelings about the game.
Was a control group utilised?	No.
Reference	Mallon, B., Webb, B. (2006) Applying a Phenomenological Approach to Games Analysis: A Case Study. ISAGA. Vol 37 (2), p. 209-225.

	Electromagnetism Supercharged!: Learning Physics with Digital Simulation Games
Qualitative or Quantitative?	Quantitative.
Primary or Secondary?	Primary.
What methodology is utilised?	Observational research, tests, random interviews, exams.
What is the research design?	Pre-test. Random pre-experimental interviews. Observational research with 5 cameras per classroom in addition with two researchers recording students' discussions and interactions with each other, the game, frustrations and successes. Post-experimental interviews. Post-test.
Empirical or Discussion?	Empirical.
Are there participants? How many?	An 8th grade teachers' classroom, with a total of 96 students in 5 separate classes.
What are the research questions?	1. What social practices emerge as student engage in collaborative and cooperative games? 2. What strategies do teachers use to incorporate the game into their curricula?

	3. What is the impact of learning with Supercharged on students' learning of electrostatic concepts?
What are the results?	Both the experimental and control groups improved their understanding of basic electrostatics. However in answering interview or test questions, the control group were relying on their ability to memorize information while the experimental group were recalling experiences and challenges in Supercharged.
What are the limitations?	Many students were initially confused by Supercharged, then complained about the nature of the activity, and reluctant to engage in discussions due to the teacher-student culture cultivated. After a day of playing, few students were critically reflecting on their play, losing interest in playing due to poor controls, or repetitive gameplay or technical issues, or "beating" the game. Students also did not pick up more complex concepts as they were introduced in cutscenes - which were promptly skipped - as they were not vital in the gameplay.
What analysis techniques are used?	Tables were used to format the pre-post test scores, and pictures were used to reference the game or make visually clear the concept that was being explained.
Was a control group utilised?	Yes. Two classes, total of 35 students, as control group.
Reference	Squire, K., Barnett, M., Grant, J., Higginbotham, T. (2004) Electromagnetism Supercharged!: Learning Physics with Digital Simulation Games. ACM Digital Library. p. 513-520.

	Evaluation of a Game to Teach Requirements Collection and Analysis in Software Engineering at Tertiary Education Level
Qualitative or Quantitative?	Quantitative.
Primary or Secondary?	Secondary.
What methodology is utilised?	Tests. Interviews.

	Case studies. Experiments.
What is the research design?	Pre-test. Paper-Based Case Study / Role-Play Case Study / Game with control groups. Post-test.
Empirical or Discussion?	Empirical.
Are there participants? How many?	Yes, total of 92 students. 55 from Higher Education (UK university level). 37 from Further Education (UK college level).
What are the research questions?	The evaluation of a game to teach requirements collection and analysis in software engineering at tertiary education level.
What are the results?	Game-based learning can be a suitable approach, and HE students learnt more than FE students. It met HE expectations with regards to 6 aspects, and met FE expectations with regards to 3 aspects. Role-play proved more effective to FE students than HE students, but the difference could not be explained by a difference of age or any significant difference.
What are the limitations?	Games can be effective for learning different tasks, but cannot take the effectiveness of one game for one group of learners and apply it to a wider area or study level. More qualitative study and experience is required for game-based learning as it is impossible to take one effective game and assume it will be effective elsewhere. Also, the maturity of students and their interest in the subject will contribute to the success of the evaluation, offering replay value and deeper learning.
What analysis techniques are used?	Tables were used to format the data collected, a screenshot of the game and a diagram to illustrate the selected experimental methodology.
Was a control group utilised?	Yes, for each experiment - paper-based / role-play / game - controls groups were utilised and data extracted alongside experimental groups.
Reference	Hainey, T., Connolly, T,. Stansfield, M,. Boyle, E. (2010) Evaluation of a Game to Teach Requirements Collection

	and Analysis in Software Engineering at Tertiary Education Level. Elsevier. Vol 56 (1), p. 21-35.

	Reports & Communications: Debriefings of Web-based Malaria Games
Qualitative or Quantitative?	Qualitative.
Primary or Secondary?	Primary.
What methodology is utilised?	Case study.
What is the research design?	Post experience debriefing.
Empirical or Discussion?	Discussional.
Are there participants? How many?	1 participant.
What are the research questions?	1) As a review, in your own words, what was the game all about? 2) How did you feel after the game? 3) Did you like the game? Why or why not? 4) Did the game cover anything about mosquitoes/the malaria parasite that is important to you? If so, please explain. 5) Did you learn some new things about mosquitoes/the malaria parasites? If so, what are they? 6) Are there some things you would now like to do to better prevent malaria? 7) Is there anything you can suggest to make the game better?
What are the results?	Game 1 - Mosquito Game: The player enjoyed the game, but felt the objective of the game should be reversed. A single level and little time spent playing the game reduced solidifying learning concepts but as bats were introduced as mosquito-eaters, the player's attitude to them improved positively.

	A single viewing of mosquito eggs and its life cycle, while focusing on playing as the adult mosquito, reduced the concept of prevention and elimination of mosquito breeding sites while only focusing on the prevention of being bit. Game 2 - Parasite Game: The player enjoyed the game, but felt the objective of the game should be reversed. The game was completed quickly, thus limiting effects of the learning concepts, and some learning objectives were not made clear to the player.
What are the limitations?	The time spent playing the game, and how it was a one-off occurrence which reduced repetitive learning experiences. Some game design aspects which made some learning objectives unclear or was not explored.
What analysis techniques are used?	Debriefing questionnaire.
Was a control group utilised?	No.
Reference	Lennon, J. (2006) Reports & Communications: Debriefings of Web-based Malaria Games. ISGA. Vol 37 (3), p. 350-356.

	The Differences in Motivations of Online Game Players and Offline Game Players: A Combined Analysis of Three Studies at Higher Education Level
Qualitative or Quantitative?	Quantitative.
Primary or Secondary?	Secondary.
What methodology is utilised?	Questionnaires. Surveys.
What is the research design?	A pre-test questionnaire was sent out to garner interest and answer demographic questions like age and gender. Controlled trial as the students played the game. Post-test to gather data on the game played and how they enjoyed it.
Empirical or Discussion?	Empirical

Are there participants? How many?	2226 usable results combined over a 4 year period from 2005 to 2009.
What are the research questions?	1. Reasons for playing game. 2. Reasons for using computer games for learning in University. 3. Attitudes to computer games. 4. Preference of single player or multiplayer computer games. 5. Preference of playing computer games online or offline.
What are the results?	Male participants played games for significantly more per week, and for longer than female participants. Male participants were also more likely to play multiplayer for the recognition, challenge, and competition. Single player/multiplayer preference only impacts two attitudes to playing computer games while online/offline participation impacts eight attitudes.
What are the limitations?	The participants surveyed were studying at university, thus only gained an insight to HE students, and HE students are in a smaller age range. People outside those areas were not tested, and so did not give a view which could be applied to the general population.
What analysis techniques are used?	Graphs were used to illustrate between single player and multiplayer, rating of game genres, motivations between the genders, and individual motivations. Tables were used to format data collected from the three studies.
Was a control group utilised?	No.
Reference	Hainey, T., Connolly, T,. Stansfield, M,. Boyle, E. (2011) The Differences in Motivations of Online Game Players and Offline Game Players: A Combined Analysis of Three Studies at Higher Education Level. Elsevier. Vol 57 (4), p. 2197-2211.