Using Computer Games to Teach Social Studies

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Abstract

This study investigates the effectiveness of two computer games as learning tools in comparison to established learning tools teaching two different topics in the course *Social Studies 1b* of the Swedish Upper Secondary School Curriculum. The use of computer games in education is placed in the context of changing ideas of the aims for education systems in the 21st Century with regard to student skills rather than content, including digital skills. The findings indicated that using these particular computer games as learning tools for these topics was at least as effective as the alternative, more established, lessons. Focus group discussions with students after the study lesson indicated a preference for variation in teaching methods and the desire for learning activities that require active student participation.
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Introduction

Computer games are in the process of transition from a time-wasting exercise for children to a legitimate activity, and subject for academic research, for adults. It could be that the players have grown up but do not want to stop enjoying their pastime, however when James Paul Gee (2005) claims that “video games are good for your soul” and Jane McGonigal (2011) explains why “games make us better and how they can change the world” it would appear that it is more than players wanting to cling to their childhood. The positive attitude to computer games is not without its opponents, there is certainly a significant movement against violence in games aimed at children, at least in the popular press. At the same time as computer games are beginning to be regarded as a serious art form, education systems are facing the challenge of how to prepare students for the 21st Century and a future that is difficult to define. There would seem to be agreement that students need to be prepared for a constantly changing, globalised world with skills that allow them to learn and adapt throughout their lives, which includes the ability to use a wide range of technologies. Given all these factors it becomes very interesting as to whether computer games not only have the potential to contribute to improved life but also whether current games have the ability to positively contribute to learning. This study aims to help understand the place that computer games may be able to take in education and investigate if there are games that can be used as effective learning tools in a social studies curriculum.
Background

Education

Education has undergone a few great shifts throughout modern history and recent discussion has focused on educating students for the 21st Century. A number of organisations have defined skills and competencies that education should be focusing on for the future, including UNESCO (Delors 1996), the European Union (2006) and The Partnership for 21st Century Skills (2009), amongst others (see Dede (2009) for a comparison and summary). More recently Boix-Mansilla and Jackson (2011) have also worked on developing competences that are needed to help prepare youth engage the world, an idea that has grown in parallel to globalisation. They define four competences:

1. Students investigate the world beyond their immediate environment.
2. Students recognise their own and others’ perspectives.
3. Students communicate their ideas effectively with diverse audiences.
4. Students translate their ideas into appropriate actions to improve conditions.

These discussions and new goals for education represent a significant change from earlier paradigms that centred around the Church during medieval times (in Europe at least), and then after the industrial revolution on the need of the State to meet the increased demand for educated people. Whilst there are some differences between the reports and specific recommendations from the various groups and organisations, they all mention the need for developing students’ use and understanding of digital technologies. It is from this position that education must continue to investigate the use of new technologies and new tools in a learning environment. Games and roleplaying were used in teaching and learning before computers were introduced to schools, so the shift to be now looking at the possible use of computer games is not such a great leap. Using play and games to learn, an established and common method, combined with new technologies can hopefully bring enhancements and more realism to game-based learning.
Computer Games Usage

Leisure Time

The use of computer games has increased in parallel to the increase in ownership and power of computers. In the most recent report from the Swedish Media Council (2010), investigating children and young people’s use of media, it is reported that 74% of 12-16 year olds had a computer in their room, which is a significant increase from the figure of 40% from the 2005 report. Amongst this age group (12-16), which is closest to the ages of the students used for this study (16-17), 43% responded that they often play computer games in their leisure time and after school (2010, p.31). Their was a very large gender difference in the responses with only 20% of females responding that they often play computer games whilst the figure for males was 72% (2010, p.33).\(^1\) In response to the more general question of “If you think of your leisure time, how often do you play computer games?” 64% of 12-16 year olds replied at least once a week (2010, p.35). The report also discusses the number of “frequent users”, which the Council defines as 3 hours or more of a particular activity.\(^2\) In the same age group of 12-16 year olds, 18% of the respondents classified themselves as frequent users (2010, p.37), within this category there was also a large difference according to gender: 24% of male respondents were frequent users whereas only 4% of female respondents stated the were frequent users (2010, p.38).\(^3\) The information that the Swedish Media Council gathered regarding the playing of computer games among young people would indicate that it is not an uncommon activity during their leisure time.

The InterActive Education Project, based at the Graduate School of Education at Bristol University, conducted similar surveys to those of the Swedish Media Council in the South-West of England. Although these surveys were conducted in 2001 and 2003, and contained different questions, it is possible to make some comparisons. In response

\(^1\) The gender comparison is based on all respondents of all ages, which includes children (9-12 years) and young people (12-16 years), however it should be safe to assume that the gender difference exists within both age groups to similar levels.

\(^2\) The report does state that “frequent user” is a hard term to define, as many activities require a substantial time investment. The report regards the differentiation primarily as a practical division rather than an established definition that denotes risky or negative behaviour.

\(^3\) See footnote 1.
to the question of if they played computer games at home, 76% replied at least weekly in the 2003 survey (up from 69% in the 2001 survey). A gender split was evident in this survey too, 59% of male respondents played computer games at least weekly at home whereas only 35% of the female respondents replied similarly. There was a decrease in the playing of computer games as the students grew older, 83% of the year 8 students (12-13 year olds) down to 68% of the year 10 students (14-15 year olds) (Kent & Facer 2004, pp.446–9). Similar numbers were reported from a small national survey conducted in England and Wales in conjunction with a case study in 2006 (Sandford et al. 2006, p.17). Paraskeva, Mysirlaki and Papagianni refer to a number of studies that have investigated game usage all of which indicate high and growing number of game players, the most recent study they mention by the Entertainment Software Association from 2009 claims that 68% of households in the USA play computer or video games which was an increase of three percentage points on the year before (2010, p.499). Whilst it is hard to draw any strong conclusions from the comparisons due to their different questions, as well as the number of years between the surveys, all seem to indicate a widespread use of computer games in general as well as this being an increasing trend.

**In Education**

The use of computer games in education is increasing, although it would appear that this is not occurring at a comparable rate to the increase of computer gaming in general. There are examples of commercial off-the-shelf (COTS) games being used in education, although Kirriemuir and McFarlane (2004) claimed that this remained rare and was hindered by a number of issues that complicated their integration with the curriculum including the difficulty of identifying which games would be appropriate for particular sections of a curriculum, challenges in persuading stakeholders to the benefits of computer games, lack of time for teachers to familiarise themselves with games as well as parts of the games which are irrelevant to the curriculum and not be an effective use of lesson time. They also discussed the development of computer games for education that is driven by a belief that games can help make learning fun whilst at the same time being a powerful learning tool as games encourage “learning by doing”. Many of these efforts have been less than successful for a number of reasons, such as the games being too simplistic, the repetitive nature of the tasks and poorly designed learning progression. Also, the need to make learning ‘fun’ is questioned as many argue that children find learning enjoyable anyway.
Thoughts about Games as Learning Tools

James Paul Gee talks about games being good and good for us, or rather the fact that they can be, as well as writing at length about the ways in which computer games can be good for learning (see Gee (2003; 2005; 2007; 2008)). Jane McGonigal (2011) talks even more expansively of the ability of games to make us better and change the world. Much of what the two aforementioned authors, and many others, discuss is the ability of games to engage players and hopefully through that lead to positive behaviour change or learning. These ideas have contributed to the development of the Serious Games movement.

Serious Games

Serious games is a term used to describe games that are designed to do more than just entertain, the product has another aim from the outset. The term can include games driven by educational goals, as well those trying to promote attitude or behaviour change, which could include advertising or promotional games for health, social or political purposes. Boyle et al. (2011) discuss the diversity of the use of the term serious games and lament the lack of coherence and fragmentation in classifying games. This lack of agreement over the term has not stopped research into the area, of particular note is the number of papers describing frameworks for the design of serious games even though many have different definitions of the term or have chosen to focus on one particular sub-category; see, for example, Annetta (2010), Gunter et al. (2008), Westera et al. (2008). This particular issue is specifically mentioned by Connolly et al. (2012, p.672) who suggest “that there is still confusion concerning the characterization of a serious game”.

Game Genres

The idea of classifying games into genres appears in both the academic study of games as well as popular culture discussions and reviews. As Egenfeldt-Nielsen et al. (2008) discuss, many different systems of categorisation have developed in different forums as attempts to classify games by genre are always going to be arbitrary as there are no objective measures. Some systems focus on the representational or surface phenomenon whereas others focus on interactivity which is closely linked to the goals of the game, Wolf (2001) thought the latter to be more appropriate however this led him to identifying 43 distinct genres. Egenfeldt-Nielsen et al. (2008) propose a system based on
the criteria for success in a game. This led them to four genres: Action Games, Adventure Games, Strategy Games, and Process-orientated Games. Despite their extensive research and experience in the areas they still recognise that there are many popular games that do not easily fit into one of their genres, once again indicating the difficulty of genre categorisation systems.

Development of Information and Communication Technology in Schools

The use of ICT in schools has increased in tact with the general development of technology, albeit with a certain delay between what comes to market and that which is available and affordable to schools. The IEA\(^4\) Second Information Technology in Education Study, conducted in 2006 in 22 education systems from mainly OECD\(^5\) countries, found nearly 100% ICT access in schools, however in most systems less than 60% of teachers use ICT in teaching. The study also found no correlation between student-computer ratio and the percentage of teachers reporting use of ICT in education (Law & Yuen 2008). In Sweden at least 202 of 290 municipalities have some form of 1:1 student laptop (and/or other device) strategy, many of them a significant and wide initiative (Taawo et al. 2012). The earliest reported student laptop program began in 1990 (MLC n.d.) but it was in 2002 that the, now probably most well known, programme in the Maine was initiated (Maine Department of Education 2012a). The state-wide programme in Maine is one of the largest in the world and has also been accompanied by significant research efforts (Maine Department of Education 2012b). Whilst many initiatives and investments are being made in relatively wealthy countries it has not been exclusively so, for example the One Laptop per Child (OLPC) project aims to provide affordable and reliable laptops to developing nations and is already active in countries such as Kenya, Nepal and Uruguay (OLPC 2012). It is beyond the scope of this paper to provide a comprehensive overview of the development of ICT use in schools, however from the examples above it can be seen that ICT is being used in schools and this use is increasing.

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\(^4\) International Association for the Evaluation of Educational Achievement

\(^5\) Organisation of Economic Co-operation and Development
Earlier Research in the Field of Computer Games and Learning

The connection between computer games and learning is one that has attracted interest for the past few decades, and the recent increased attention to “gamification” has expanded the discussion. However a number of studies and literature reviews in the past decade have referred to the lack of research, particularly empirical, into computer and video games. Savill-Smith and Mitchell (2004) identified eleven literature reviews that had been undertaken in areas associated with the use of computer and video games; there was little evidence for causal relationships and few firm conclusions could be drawn, except that there was a lack of research. Squire (2006) also talked about the relative lack of research into video games, and six years later Connolly et al. (2012) were still bemoaning the lack of research and empirical evidence in the field of computer game usage in education and learning, although they do identify a large body of work talking about the possibilities that computer games contain.

In 2004 Savill-Smith and Mitchell identified five main themes in the field of research covered by the eleven literature reviews they analysed:

1. Investigations into whether there is a link between violent tendencies and aggression in people who use computer games, in that they would then imitate what is seen on screen;
2. Specific examinations of their use with a particular age group such as children;
3. Investigations that have taken a broad review approach;
4. A comparison of the effectiveness of games and conventional classroom instruction in the teaching of students;
5. An investigation on instructional gaming and the implications for technology.

(Savill-Smith & Mitchell 2004, p.4)

Of the above, theme four is most relevant for this study that came from a literature review by Randel et al (1992). In that review, the authors found that the area of social sciences had the greatest number of studies although the majority of these (33 out of 46) showed no significant difference between traditional lessons and games/simulations. As well as identifying themes, Savill-Smith and Mitchell also list a number of issues that are highlighted in the reviews they examined:

1. The literature base is relatively sparse;
2. The findings conflict in their outcomes – for example, some studies found little evidence that violent video games lead to real-life violence whereas others suggested they did;

3. Well-controlled studies of the adolescent use of video games are lacking;

4. Some studies have methodological problems in that the results depend on a single type of research method, for example observation of children’s free play;

5. Longitudinal studies are needed.

(Savill-Smith & Mitchell 2004, p.5)

As mentioned above, point one seems to be a recurrent one made by all reviews. The difference mentioned in point two could be related to the difference in research method, as outlined by Egenfeldt et al. (2008), between the Active Media perspective and the Active User perspective. The Active Media perspective views the media as actively influencing a passive user, is based more on psychology and behaviourism, and experiments generally take place in a laboratory. The Active User perspective collects empirical data from natural settings as it stresses the “active interpretation and filtering players exhibit” and bases its theoretical perspective on anthropology, cultural studies and media theory (Egenfeldt-Nielsen et al. 2008, p.224). The authors suggest the use of these two different perspectives as a reason for apparently contradictory findings in relation to computer game playing and violent tendencies.

Squire (2006, p.20) laments the lack of research that treats video games as objects worthy of serious research and then the author goes on to propose three interrelated ways in which future research should address the issue: “the critical study of games as participation in ideological systems, ‘learning as performance’ and educational games as designed experiences”. The most recent literature review, by Connolly et al. (2012), did find a large number of papers (7392) that in some way dealt with the issue of computer games and learning, however only 129 of these were relevant for their study based on the main research question: “What empirical evidence is there concerning the positive impacts and outcomes of computer games?” Of these 129 studies, only 70 were designated as being of high quality based on the research design, method, analysis, ability to generalise results and the relevance to the research questions of the new study. This highlights the imbalance between the large number of speculative writings talking about the potential of games in learning, as well as theoretical discussions of game design for learning, with little empirical evidence to support these positive views, although this has
not seemed to have subdued the interest for these writings; see, for example, Gee (2005; 2007; 2008), Prensky (2007), McGonigal (2011). The obvious interest in this area of research, coupled with the lack of empirical research, will hopefully render this study, albeit small, useful in the on-going discourse.
Theory

Learning Theories

The questions of what learning is, as well as when, where, why and how it happens, are fundamental to education. Connolly et al. (2012, p.661) refer to Boyle et al. (2011) in stating that “modern theories of effective learning suggest that learning is most effective when it is active, experiential, situated, problem-based and provides immediate feedback”. Given this reference to modern learning theories, it is important to realise that the introduction of new technology to education will not in itself change the way students learn, the technology is merely a tool to be used by teacher and learner. Looking at the competences outlined above by Boix-Mansilla and Jackson (2011) it is easy to understand the current belief that traditional teaching methods aimed at helping students merely remember large amounts of facts are not best suited to achieving these new goals. Rice and Wilson (1999) are not alone in believing that merely adding technology to a classroom will not achieve the goals stated by organisations looking at the skills needed for the 21st Century, they proffer that a shift in teaching methods based on constructivist theories is needed.

Social Constructivism

Constructivist theories focus on developing a deep understanding of concepts rather than learning behaviour or skills. This understanding is developed by the learner through an active process of interacting with their environment and culture. For this to occur learners need to take responsibility for their own learning and be self-motivated (Amory & Seagram 2003). Social constructivism is a theory of learning associated with Lev Vygotsky that emphasises the influence of cultural and social contexts in learning. There is an underlying belief that education is to develop the personality and creativity of students (Corrie 1995). Knowledge is constructed through active learning and collaboration with teacher and other learners in authentic and meaningful situations (D. M. McInerney & V. McInerney 1998). Vygotsky’s theory of the Zone of Proximal Development (ZPD) is central to social constructivism in the classroom. The ZPD describes the area of skills or tasks that cannot be performed by the student alone, but
can be accomplished with the help of others (Ewing et al. 1999). Willis, Stephens and Matthew (1995) discussed four principles of a social constructivist classroom:

1. Learning and development are social collaborative activities;
2. The zone of proximal development can serve as a guide for curricular and lesson planning;
3. Learning should occur in meaningful contexts, and
4. Learning should be related to a child’s own experiences.

It is possible that games could provide opportunities to combine the implementation and use of ICT in education with social constructivist learning theory to help students develop the global competences of investigation, recognising perspectives, communication and action. This leads to the question: What is it about games that may make them useful learning tools?

**A First Step towards Integrating Educational Theory and Game Design by JP van Staalduijen**

Van Staalduijen (2011) stresses the importance of applying learning theories to game design to facilitate learning, however insight into learning through games is limited. It is unclear why, when, how and what people learn from which phase of playing games. It is also unclear what influence individual facilitators have on learning outcomes of a game. The aim of his study was to start to look at which game “elements” (also called “attributes”) contribute to learning, due to the lack of understanding of links between games and learning. The learning that van Staalduijen focuses on is “deep learning” which is sometimes referred to in literature as “meaningful learning” and the aim is to ascertain to what degree this can be achieved in games. The oft discussed intrinsic motivation that players of games appear to display and the ability of players to enter a state of “flow” (as described by Nakamura and Csikszentmihalyi (2002)) are seen as strong benefits for game players and learning through games. This learning through play and games is often built on the social constructivist theory of learning.

Van Staalduijen (2011) aims to begin a process towards a game based learning model by combining three strands of research to develop an initial overview of deep learning. These strands are:

1. Research on game design which, whilst there is no ultimate design method, does provide suggestions for design;
2. Educationalists contribute overviews of educational elements and principles in game design;
3. Efforts to identify the ‘core elements’ that make up all games, whether educational or for entertainment.

This initial overview will then be a first step in creating a game based learning model. An exhaustive literature review was conducted to identify elements in games that “are assumed to increase the learning effect of serious games” (2011, p.104). The literature review identified 25 game elements that relate to learning (see Table 1).

After conducting the literature review and compiling the overview of game elements the author conducted a first case study that investigated the perceived influence of game elements by students who played a particular game. Sixteen of the twenty-five game elements were evident in the game being studied and therefore these were the elements that students were asked about. There were no elements that returned conclusive negative scores, and students indicated that at least nine of the game elements contributed to their learning. In the conclusion van Staalduinen does point out three limitations of the study: no valid method to objectively study the game elements independently, the apparent interconnectedness of many game elements, and the reliance on student experiences to determine which game elements have an impact on learning. The study was not focused on games versus other methods of instruction, rather what it is about games that contribute to learning, on the assumption that learning does occur and is hopefully relevant.

Table 1 Game elements and definitions (recreated from van Staalduinen (2011, pp.105–6))

<table>
<thead>
<tr>
<th>Game element</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action-Domain</td>
<td>The story of the game consists of situation where the learner really needs to apply the knowledge that he gains from playing the game. This includes a close enough link to reality so that learners easily see how to apply knowledge to the real world.</td>
</tr>
<tr>
<td>Adaptation</td>
<td>The level of difficulty of the games gradually increases, or adjusts to the skill level of the player.</td>
</tr>
<tr>
<td>Assessment / Feedback</td>
<td>The measurement of achievement within game (e.g. scoring). The game gives the learner feedback on the outcomes of his actions. This provides users with opportunities to learn from previous actions. Scoring also compares performance among (competing) players.</td>
</tr>
<tr>
<td>Challenge</td>
<td>The amount of difficulty and probability of obtaining goals a player has within the game. A challenging game possesses multiple clearly specified goals, progressive difficulty, and informational ambiguity. Challenge adds fun and competition by creating barriers between current state and goal state. Combined with feedback, it provides a systematic balance of difficulty that changes as the learner progresses.</td>
</tr>
<tr>
<td><strong>Conflict</strong></td>
<td>Solvable problems that the player is confronted with within the game and that usually drive the game’s plot or in-game action by providing interaction. Conflict can be provided by the game itself (e.g. puzzles), by autonomous game agents (e.g. enemies) and by other players.</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>The player’s possibilities for active and direct manipulation of specific aspects of the game. In order to exert control, the learner needs to be active in making decisions in the story. Abundant learner control gives the player a sense of unrestricted options.</td>
</tr>
<tr>
<td><strong>Debriefing / Evaluation</strong></td>
<td>To utilise opportunities for learning, an evaluative session (the debriefing) is held after the game. In the evaluation the players and the facilitator / teacher talk about the experiences and outcomes of the game. The individual player can be evaluated, the players can be evaluated as a team, or they can be evaluated both as a team and as individual players.</td>
</tr>
<tr>
<td><strong>Fantasy</strong></td>
<td>The make-believe aspects of the game: environment, scenarios (narrative), the role(s) of the player, non-player characters (game agents) that can be interacted with.</td>
</tr>
<tr>
<td><strong>Goals / Objectives</strong></td>
<td>Goals and objectives describe the game’s win conditions. In this capacity they provide motivation for actions within the game. The game’s objectives can either be absolute (unchanging), or subject to change, depending on specific circumstances, scenarios and player actions.</td>
</tr>
<tr>
<td><strong>Instructions / Help / Hints</strong></td>
<td>Helpful comments, tutorials, and other hints that the game provides in order to get a player started with quickly, to get him out of a difficult situation, or to get him acquainted quickly with newly introduced aspects of a game.</td>
</tr>
<tr>
<td><strong>Interaction (Community)</strong></td>
<td>“Interpersonal activity that is mediated by technology, which encourages entertaining communal gatherings by producing a sense of belonging.” (K. A. Wilson et al. 2009, p.230)</td>
</tr>
<tr>
<td><strong>Interaction (Game equipment)</strong></td>
<td>“The adaptability and manipulability of a game. The game changes in response to player’s actions.” (K. A. Wilson et al. 2009, p.230)</td>
</tr>
<tr>
<td><strong>Interaction (Interpersonal)</strong></td>
<td>“Face-to-face interaction, relationships between players in real space and time, it provides and opportunity for achievements to be acknowledged by others, and challenges become meaningful, which induces involvement.” (K. A. Wilson et al. 2009, p.230)</td>
</tr>
<tr>
<td><strong>Language / Communication</strong></td>
<td>Specific lingual or communication rules of the game.</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>The physical or virtual environment in which the game takes place; thus linked to ‘fantasy’. Location influences rules and solution parameters.</td>
</tr>
<tr>
<td><strong>Mystery</strong></td>
<td>The gap between available information and unknown information. Mystery provides puzzlement and complexity, and triggers curiosity, and is enhanced by surprise and unpredictability (random elements).</td>
</tr>
<tr>
<td><strong>Pieces or Players</strong></td>
<td>The game pieces (objects) or people that are included in the game scenario. This includes game items, player characters (avatars) and real life human participants.</td>
</tr>
<tr>
<td><strong>Player Composition</strong></td>
<td>The organisation of players in a game; individual, as a team, multiply individuals (multiplayer), or multiple teams</td>
</tr>
<tr>
<td><strong>Problem-Learner Link</strong></td>
<td>The way in which the game’s location, theme and story relate to the learner’s interests. It makes the game relevant to the player.</td>
</tr>
<tr>
<td><strong>Progress</strong></td>
<td>The measure of how the player progresses in achieving the goals (win conditions) of the game.</td>
</tr>
<tr>
<td><strong>Rules</strong></td>
<td>Rules constitute the inner, formal structure of games. Rules impose limits on player action. The rules also set up potential actions, actions that are meaningful inside the game, but meaningless outside. Rules specify limitations and affordances. Rules establish criteria for how to win.</td>
</tr>
<tr>
<td>Safety</td>
<td>The lack of real world consequences that action within the game have; the only consequence is a possible loss of dignity when losing. This provides players with a safe way to experience the reality, as presented in the game. It allows for risk-taking and experimentation, thus providing players with more learning opportunities.</td>
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<tr>
<td>Scope</td>
<td>The player’s perception of the game’s reality, that the game allows; a more narrow scope of representation provides a player with focus, a broader scope of representation provides a player with distractions.</td>
</tr>
<tr>
<td>Sensory Stimuli</td>
<td>The game’s presentation stimulates player's senses and tap into the player's emotions, allowing for a (temporary) acceptance of the games' reality (fantasy, location, theme) by the player.</td>
</tr>
<tr>
<td>Theme</td>
<td>The setting or context of the game. A game is a thematically driven experience.</td>
</tr>
</tbody>
</table>
Research Question

Access to computers during leisure time and in schools is increasing, games in general and more specifically computer/video games have been discussed as learning tools in the past few decades including their relationship to learning theories, and there is a small but growing body of empirical research, on top of theoretical and speculative writings. Given the background described above this study looks at the questions:

Is it possible to use computer games as learning tools in secondary school social studies?

a. Are there any suitable games?

b. Are there measurable effects?

c. How do they compare to other teaching tools?
Method

Choice of Method

As evidenced by Connolly et al. (2012) there is a large number of papers that discuss the use of games in learning (primarily digital games) however of the 7392 papers they found within their search terms only 129 provided empirical evidence (1.7%) and of those they classified only 70 as providing higher quality evidence (0.9%). Whilst the current study is only of a small scale, it is important to contribute to the development of empirical studies in the field of computer games in education, hence the choice of an empirical method for this study.

Measurement Difficulties

This study focused on the course Social Studies 1b that is a compulsory course for all students attending upper secondary school in Sweden who are enrolled in a three-year programme designated as “higher education preparatory programmes” (Skolverket 2012c, p.16). It is within the constraints of this course that the measurement of knowledge and skills for this study was conducted. In practice this meant using the grading criteria described by The Swedish National Agency for School Education (Swedish: Skolverket) according to a six level grading system that was implemented in August 2011. The grading levels go from A down to F, where A to E are all passing grades and F indicates a failure to meet the minimum level required to pass the course. The Agency provides written descriptions only for levels A, C and E which apply to the course as a whole rather than individual tasks; levels B and D are used when setting the final grade for the course and are defined as meeting all of the requirement of the level below and most of the requirements for the level above (Skolverket 2012c, p.57). For the purposes of this study the requirements for levels A, C and E that relate to the specific topics covered were used to evaluate the quality of the responses by the students in the pre-test and post-test. This, of course, introduces the element of human interpretation of grading criteria, however this is a constant aspect of the Swedish education system and also a necessary aspect if an education system is to promote and require the development of skills beyond factual recall, particularly in a subject such as social studies. In this study one person completed all assessment of student responses and for measurement
purposes it is the change in the quality of response from pre-test to post-test that is important rather than the absolute level of the response.

Choice of Games

In this study two games were tested in secondary school education and compared with more established learning tools to teach specific topics in the Social Studies 1b course. The choice of games took a considerable amount of time, as it was necessary to find games that met the content requirement of the course and ones that were deemed an appropriate learning tool (based on the discretion of the teacher running the study). There were a large number of games that were deemed inappropriate for the current study. The two games that were chosen were Rixdax by the Swedish National Parliament (Sveriges Riksdag n.d.) and Global Conflicts: Sweatshops by Serious Games Interactive (N.d.).

Difficulties with Finding Appropriate Games

COTS games such as Sim City, The Sims or Fate of the World all require gameplay time that would take time from the many other areas of content that need to be covered in the Social Studies 1b course. In some ways this is unfortunate as the quality of commercial games often exceeds that of educational games. There were a number of other education-focused games that were looked at for their suitability for this study however it was difficult to find any that met the course requirements and goals, as well as the ideas of social constructivism in teaching. Falling in the too long and inappropriate category were games such as Caesar III, Quest Atlantis, Wolf Quest and Evoke. Frontiers, which is an expansion to Half Life 2 (and can also be played online via Steam), appeared interesting but the need for a gaming console or the installation of Steam on a computer meant that the technical requirements made it unsuitable for this study as it is important for teachers that the time preparing a learning activity is not disproportionate to the time the learning activity is used in the classroom. A game in development, Warco, where the player is a journalist in an armed conflict zone, looks as though it could be useful although is not even at public beta stage yet. An online platform that contains games and lessons plans for the teaching of civics founded by an American judge, iCivics, contains a number of games that do cover some of the content included in Social Studies 1b however the games were thought to be too easy and repetitive, and did not require higher-order thinking skills. Against All Odds, commissioned by UNHCR, is designed to give the player an insight into
the plight of refugees although, in common with iCivics, it did not require higher-order thinking. *Amnesty – the Game* was another option that was looked at, although the gameplay was deemed to be too slow for use in the classroom and it was unclear as to the learning outcomes, however the Facebook integration implies that it is trying to be part of a social media campaign rather than specifically a teaching tool.

**Choice of Students**

The senior secondary school in which the study was conducted is located in a wealthy suburb in greater Stockholm, and whilst there is open enrolment with selection based on grades from junior secondary schooling most of the students come from the local municipality or bordering ones of similar socio-economic standard. This is primarily due to the length of time and ease that it takes to travel to the school by public transport. The municipality in which the school is located has the highest rate of post-secondary educated inhabitants in Sweden, 53% of all people (25-64 years old) living in the municipality have studied at least three years tertiary education. The two neighbouring municipalities that also contribute significant numbers of students are also placed in the top ten municipalities in Sweden with the highest percentage of post-secondary educated inhabitants, at 38% and 36% respectively (SCB 2010). The school provides three of the higher education preparatory programmes (Business Management and Economics, Natural Science, and Social Science). Entrance to senior secondary schooling in Sweden is based exclusively on grades attained in junior secondary schooling and the school used for the current study usually requires a very high average grade to be accepted, as there is high demand for the places in the school. This high level of student academic performance is also reflected in their grades when graduating from secondary schooling, where the graduating class regularly has one of the highest grade point averages in Sweden (Skolverket 2012a). The students used in the topic 1 study were in their first year of senior secondary schooling (16-17 years old) and enrolled in the Social Sciences programme. The students used in the topic 2 study were also first year students, however these were enrolled in the Natural Sciences programme. Despite the different programmes the course, *Social Studies 1b*, has exactly the same content.
Student Computer Game Usage

The students who participated in the study answered one question regarding their use of computer games in their leisure time. The results in table 2 compare the answers from the two groups from this study with the results collated by the Swedish Media Council from their most recent survey (2010, p.36). The topic 1 group (n=17; male=3, female=14) match fairly closely the results of the Swedish Media Council, whilst the topic 2 group (n=22; male=9, female=13) would appear, on average, to play games much less than the norm in Sweden.

Table 2. Student computer game usage.

<table>
<thead>
<tr>
<th></th>
<th>Swedish Media Council</th>
<th>Topic 1 group (n=17)</th>
<th>Topic 2 group (n=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;5 hours</td>
<td>5%</td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td>3-4 hours</td>
<td>13%</td>
<td>35%</td>
<td>9%</td>
</tr>
<tr>
<td>1-2 hours</td>
<td>28%</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>&lt;1 hour</td>
<td>30%</td>
<td>29%</td>
<td>59%</td>
</tr>
<tr>
<td>Not at all</td>
<td>22%</td>
<td>29%</td>
<td>9%</td>
</tr>
</tbody>
</table>

In response to the question “If you think about a normal day, for roughly how long do you play computer or video (console) or internet games in your free time?”
Procedure

The test lesson began with a brief introduction to the nature and purpose of the study as well as the particular lesson that the students were about to complete. The students were informed of the topic of the lesson but given no further details at that stage. The students then completed the pre-test, after which there was a general introduction for all students in the class. The students were then randomly sorted into mixed sex pairs, although due to uneven sex balance within the classes some pairs were same sex. The reasons for male-female pairing is partly due to recommendation from the makers of the “Global Conflicts: Sweatshops” game in their Teacher’s Guide (Serious Games Interactive 2010b, p.5). Mixing groups also follows a pattern common in the study school’s teaching of courses in the first year where the teachers choose groupings and often try to mix sex, as many students tend towards same sex groupings; from a socialisation point of view, and harmony in the class, it is desirable try to have all students in the class work with as many others as possible during the course of a year. The pairs were randomly assigned to either the computer game group or the control lesson group. The two groups completed their lesson with support from the teacher (also leader of the study); both alternatives were allocated the same amount of time. At the conclusion of the activities all students completed the post-test, which was identical to the pre-test. After students had completed their post-test, some were asked to participate in a focus group.

Pre-test and Post-test

The pre-test and post-test were identical for topic 1 and topic 2 respectively. The questions were based on the knowledge and understanding that was covered by the lesson. The answers to the tests were assessed based on the grading criteria from the National Agency for School Education (as mentioned above) and then given a grade of A, C, E or F. The results were compared for each individual student for every question and any change given a number between negative three and positive three according to how many grade steps the answer had increased or decreased, i.e. an increase from E to C returns a result of “1”, a decrease from C to F returns a result of “–2”.

Focus Groups

A focus group is “a research technique that collects data through group interaction on a topic determined by the researcher” (Morgan 1996, p.130). Focus groups are a particular
type of group interview that must have a moderator and where the aim is academic research rather than other possible aims for group conversations such as therapy or learning. These discussions can be unstructured, or half-structured as in this study, although they are always arranged in some way. They are not a quantitative research method rather, in this study, used to gain a better understanding of student attitudes towards the use of computer games in education. The use of focus groups as opposed to individual interviews was chosen as it was believed to be more comfortable for the students to participate in a group discussion and it also opens up for the possibility for the students to develop on each other’s, as well as their own, opinions during the interview (Wibeck 2010).

**Topic 1: Swedish Political System**

One of the learning objectives of the *Social Studies 1b* course relates to learning about political systems both domestic and foreign. The course outline produced by the National Agency for School Education includes:

Democracy and political systems at local and national level... Opportunities for citizens to influence policy decisions at different levels. Distribution of power and opportunities for exerting influence in different systems and at different levels based on different democratic models… (Skolverket 2012b, p.9)

It is thus important for students to understand the workings of their national parliament and often this can be used later as a basis for comparison with other countries as well as international systems, such as the EU. As such, whilst it is not imperative that students remember all the details of the legislative process, it is very important that students develop an understanding for the need for appropriate and adequate processes that enhance the level of democracy within the system. One important realisation is that a democratic system is not only about efficiency, rather that the opposite is often true and decisions should not be able to be rushed; the system should force discussion and debate.

**Control Group Learning Activity**

The learning objective of understanding the legislative process is not one that is met with joy by most students, it is often seen as a boring part of the course and therefore an area where it can be important to attempt to engage the students through innovative teaching methods. The strategy in recent years has been to pair up the students and have them...
create a flow chart of the legislative process, in either analogue form (coloured pens and paper) or digital form (their choice of software on their laptops). They have had access to the text book, which this year was “Reflex Plus” by Almgren et al. (2011), as well as the Internet, with the suggested sources being the websites of the Swedish Parliament and the Swedish Government, from observation over the years it has been noted that the students often use Wikipedia as well. The students receive a list of terms that have to be included in their final product, for which they have had approximately two hours class time to complete. The instructions given to the students are detailed below.

**Instructions**

Your task is to draw a flowchart that explains the Swedish political system. The flowchart is designed to help you understand how the various terms are connected. It is important that you can justify the layout and form of your flowchart so make sure you think carefully about how everything is connected. The flowchart should be based on the reading you did for homework (Reflex p. 105-132) as well as the website of the Swedish Parliament ([www.riksdagen.se/](http://www.riksdagen.se/)) and the Government website ([www.regeringen.se/](http://www.regeringen.se/)). Feel free to use your creativity in this task – colours and pictures! You will complete this task in pairs. This task can be completed in Swedish.

The following key terms **must** be included in your flowchart:

<table>
<thead>
<tr>
<th>Swedish</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talman</td>
<td>Speaker (of the Parliament)</td>
</tr>
<tr>
<td>Proposition</td>
<td>Proposition</td>
</tr>
<tr>
<td>Riksdagen</td>
<td>Parliament</td>
</tr>
<tr>
<td>Verkställande macht</td>
<td>Executive power</td>
</tr>
<tr>
<td>Lagstiftande macht</td>
<td>Legislative power</td>
</tr>
<tr>
<td>Regeringen</td>
<td>Government</td>
</tr>
<tr>
<td>Utskott</td>
<td>Committee</td>
</tr>
<tr>
<td>Proportionellt valsystem</td>
<td>Proportional electoral system</td>
</tr>
<tr>
<td>Partier</td>
<td>Parties</td>
</tr>
<tr>
<td>RF</td>
<td>The Instrument of Government</td>
</tr>
<tr>
<td>SO</td>
<td>The Act of Succession</td>
</tr>
<tr>
<td>Folket</td>
<td>People</td>
</tr>
<tr>
<td>Motion</td>
<td>Motion</td>
</tr>
<tr>
<td>Dömande macht</td>
<td>Judicial Power</td>
</tr>
<tr>
<td>YGL</td>
<td>The Fundamental Law on Freedom of Expression</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>Statschefen</td>
<td>Head of State</td>
</tr>
<tr>
<td>Departement</td>
<td>Department (Government)</td>
</tr>
<tr>
<td>Statministern</td>
<td>Prime Minister</td>
</tr>
<tr>
<td>TF</td>
<td>The Freedom of the Press Act</td>
</tr>
<tr>
<td>Parlamentarism</td>
<td>Parliamentarism</td>
</tr>
<tr>
<td>Rikets finanser</td>
<td>The nations finances</td>
</tr>
</tbody>
</table>
Granska regeringen & myndigheter | Audit / oversight of Government and its Agencies
---|---
Förvaltningen | Administration (State)
Domstolar | Courts

(Walls 2011)

**Alternative Learning Activity**

An alternative learning activity for this particular learning objective was based on an online game. *Rixdax* is a game produced by the Swedish Parliament that is designed to give students an idea of how the parliamentary process in Sweden works. The game is freely available online ([rixdax.riksdagen.se](http://rixdax.riksdagen.se)), and is designed as a single player board game (see figure 1). The game has a simple structure where a virtual dice is rolled, the player moves forward on a single-track route the number of steps indicated on the dice and is then asked a random question related to the section of the game the player is currently completing. There are five different sections based on different stages of the parliamentary legislative process. The player is given the role of a member of parliament and through answering a series of questions follows the “Parliament’s decision making process from beginning to end” (Sveriges Riksdag n.d.). A correct answer earns points and an incorrect answer deducts points; as the player is the only player on the board their next turn comes immediately after answering the question regardless of right or wrong answers. The unstated goal of the game is to collect as many points as possible, and at the completion of each section a player is placed on a points scale showing how well they have performed compared to all the other people who have played (see figures 2-5 for screenshots showing the gameplay of *Rixdax*).

During this study students will be paired and asked to play the game together on one laptop. This is to mirror the design of the original learning task and will hopefully lead to more discussion between the pair regarding the correct answers. The students will be given the same amount of time for this task as the original task and, in pairs, be able to play the game as many times as they have time for so that they can try to improve their score. The pairs were challenged to see which of them could achieve the highest score in the class. As this task is designed to increase the knowledge and understanding the students have of the learning objective, rather than summative testing of factual recall, completing the game multiple times will hopefully have a beneficial effect on the achievements of the students in relation to the learning objectives. The students will also be encouraged to find the answers in their textbook and on the same websites suggested in the original task.
Figure 1. Welcome page for Rixdax game (translation by Google Chrome web browser inbuilt service).

Figure 2. Diagram showing score in relation to other players after completion of first section.

Figure 3. An example question with 3 possible answers.
Pre-test and Post-test

It is important to not only ask basic recall questions but also questions requiring higher-order thinking, as the learning objective and course is also concerned with understanding, discussing and analysing, in addition to recalling facts and knowledge. However based on the material included in both of the learning tasks for topic 1 the opportunity to ask and answer questions requiring thinking is somewhat limited. Students were asked the following questions before completing the learning task, and then asked the same questions on completion of the learning task.

a. When and how often are there national parliamentary elections in Sweden?
b. What percentage of eligible voters voted in the most recent election? (Answer to the nearest ten, e.g. 10%, 20%, 30%…)
c. How many members sit in the Parliament?
d. How is the seating arranged in the parliamentary chamber? Why?
e. Do the prime minister and the other ministers need to be members of parliament?
f. What is the main task of the parliament?
g. When did women receive the right to vote in Sweden?
h. What percentage of members of parliament are women? (Answer with nearest ten, e.g. 10%, 20%, 30%…)
i. What is a referendum? How does it differ from a parliamentary election?
j. How many, and which, parties sit in the parliament?
k. What is the difference between a proposition and a motion?
l. What is meant when a proposal is on “referral”?
m. What is a committee?
n. What function do the committees have? Why are they important?
o. What are the Speaker’s tasks and functions?

Assessment Criteria

E:
Students can in basic terms give an account of and analyse the organisation… of different societies, and their underlying ideas.

C:
Students can in detail give an account of and analyse the organisation… of different societies and their underlying ideas.

A:
Students can in detail and in a balanced way give an account of and analyse the organisation… of different societies and their underlying ideas.
(Skolverket 2012b, pp.10–12)

Topic 2: Child Labour

Child labour is a multi-faceted, complex, societal situation that rhymes well with the National Agency for School Education’s description of the aims, core content and knowledge requirements of the compulsory Social Studies 1b (Skolverket 2012b). The aims of the general subject area of Social Studies are:

1. Knowledge of democracy and human rights, both individual and collective rights, social issues, social conditions, as well as the function and organization of different societies from local to global levels based on different interpretations and perspectives.
2. Knowledge of the importance of historical conditions and how different ideological, political, economic, social and environmental conditions affect and are affected by individuals, groups and social structures.
3. The ability to analyse social issues and identify causes and consequences using concepts, theories, models and methods from the social sciences.
4. The ability to search for, critically examine and interpret information from different sources and assess their relevance and credibility.
5. The ability to express their knowledge of social studies in various types of presentation.
(Skolverket 2012b, pp.1–2)

There are also certain parts of the core content for the Social Studies 1b course that can be connected to this topic:

• Human Rights; what they are, how they relate to the state and the individual, and how people can enforce their individual and collective human rights.
• The labour market, labour law and the working environment. Labour market partners, their different roles and their importance for social development. How the labour market works, conditions of employment.
• Economics, such as economic structures and flows in Sweden and internationally. Support, growth and business enterprise, use of resources and distribution of resources based on various conditions.
• Concepts, theories, models and methods of the social sciences in connection with investigations into social issues and conditions. Examples of methods for collecting
The issue of child labour is one that can be studied from multiple perspectives to help students gain an improved understanding of the complex nature of society and the challenges it faces.

**Control Group Learning Activity**

The students in the control group were shown a TV documentary, *Child Slave Labourers* directed by Hubert Dubois (2011), that had recently been screened by the Swedish State broadcaster and was (at that time) available on demand through their online service. The documentary was a French production of roughly one hour that was a follow-up by the filmmaker of a similar project from 20 years earlier. It investigated the issue of child labour by looking at specific examples of child labour as well as highlighting organisations that are working to end the practice. Showing films and TV programmes during lessons is not a new phenomenon and students would have experienced it at some stage during their schooling. At the conclusion of the documentary the students were given questions to discuss in their pairs, this activity was designed to have the students use and discuss the information that had been presented in the documentary to hopefully come to a deeper understanding and analysis of the issue. The discussion question were:

a. Define child labour? (Based on your own knowledge, the presentation at the beginning of this lesson, and the documentary you have just seen)

b. What reasons did the documentary give for child labour?

c. What consequences did the documentary give for child labour?

d. How may child labour be prevented? State three ways to prevent child labour.

**Alternative Learning Activity**

The alternative learning activity was based around playing the online, single player, role-playing game *Global Conflicts: Sweatshops*. The player assumes the role of a character investigating accusations of child labour in factories that the character buys leather from for his own company. According to the makers of the game:

*Sweatshops* challenges the pupils’ sense of social issues and history. The game requires them to consider problems like the consequences, national and global, of child labour;
national development versus cheap labour; a growing divide between rich (educated) people and poor (uneducated) people; political corruption; international responsibilities versus national sovereignty; individual opportunities regarded from a gender perspective; and Western values versus national development needs and national, cultural grounding.

Furthermore, the pupils will acquire social consciousness, critical skills and the ability to analyse and assess international issues and problems. Global Conflicts: Sweatshops develops the pupils’ sense of team responsibility and equips them to be active participants in the development of their society.
(Serious Games Interactive 2010b, p.16)

The description of the game from the producers above can be linked directly to the general subject aims for Social Studies, and the specific course content for Social Studies 1b detailed above.

The player, or in the case of this study – a pair of players, are presented with a short introduction to the game and the issue of child labour in Bangladesh (see figure 6) before they are transported into the actual game. There are four different locations that the character they are playing needs to visit to investigate the allegations of child labour made by Maxine (figure 7) at the factory (see figure 8). The players also have the opportunity to talk to one of the children that works at the factory and her father, as well as the final meeting with the owner of the factory. The gameplay before the final meeting is designed to be used to gather information about the issue of child labour in general as well as the specific case for this game. The gathered information is then used to make arguments which can be used during the final meeting to convince the owner of the factory to improve working conditions. There are hints and instructions throughout the game (see figure 8 for example) as well as the ability to check your progress and review the information you have collected. The conversations with in-game characters are very controlled with the player being given the choice of one to four responses to the other questions or statements made by in-game characters (see figure 9).

The game takes 30-45 minutes to complete, so can easily be used in a lesson context and in this study could be comfortably completed whilst the control group watched the documentary, even allowing for the usual IT challenges associated with introducing new tools to a group. At the conclusion of the game the students were given questions to discuss in their pairs, this activity was designed to follow up their actions during the game and involve the students in reflection on their actions as well as the game and connected issues. The aim of this is to increase the learning associated with the activity.
After Game Activities

The after game activities were as follows:

**Game summary**
Write a short, factual summary of the game storyline. Describe WHAT happened, but try to avoid explaining WHY.

**Actions and motives**
Explain the actions of three of the characters (what they do) and their motives (why they do what they do). Choose between Maxine, Hakim, Abdul, Sumi, Zahir, Raihan.

**Problem**
What is the basic problem or conflict in the game?
Define child labour? (You may use the internet.)

**How may child labour be prevented?**
State three ways to prevent child labour.

**Continue working with Raihan?**
In the game, you do not get the opportunity to break off the business relationship with Raihan and his factory. If you were in the same situation as Michael Badesha, the main character, and had had the same experiences in Dhaka, what would you do? Would you continue buying leather from the factory?

State up to three reasons for continuing the business relationship as well as three reasons for breaking it off.
Figure 6. Welcome page for Global Conflicts: Sweatshops game.

Global Conflicts Web player

Bangladesh

Introduction
I’ve just arrived in Dhaka in the hope of getting to the bottom of this case. In order to get around town, I’ve hired a rickshaw for the rest of the day. First stop will be for a meeting with Maxine. I have to find out what she knows and perhaps even talk to the girl who is said to have worked at the tannery.

Four days ago, my company - European Leatherwear Industries (ELI) – received a critical email. It was from a woman named Maxine. She claimed that she had talked to a girl who had been working at a tannery in Dhaka. This tannery supplies my company with leather. If that’s true, ELI may be in big trouble.

Figure 7. Meeting Maxine, conversation appears in lower half of window.

Hi

- Hi Maxine

Talk to Maxine, and find out what she knows.
Pre-test and Post-test

It is important to not only ask basic recall questions, as the learning objective and course is concerned with understanding, discussing and analysing, in addition to recalling facts and knowledge. This topic and both the alternative lessons lend themselves to more descriptive and analytical questions. Students were asked the following questions before completing the learning task, and then asked the same questions on completion of the learning task.
a. What is child labour? Describe in your own words what a child labourer is, and when a child may be termed a child labourer. You may take into account: how old the child is, what type of work the child is carrying out, who the child works for, whether the child gets paid or not, what the child might otherwise have spent his or her time on.

b. Why does child labour exist?

c. Is child labour a problem? Please explain your answer.

Assessment Criteria

E:
Students can also in basic terms give an account of human rights. In their analysis, students explain simple relationships and draw simple conclusions about similarities and differences between the organisation of different societies. In addition, students can in basic terms give an account of the importance of historical conditions and draw simple conclusions about contemporary social conditions, such as the development of working life, influence and are influenced by individuals, groups and social structures.

Students can analyse social issues and identify some causes and consequences. In their analyses, students with some certainty use the concepts, theories, models and methods of the social sciences. Students discuss in basic terms causes and consequences, and also possible solutions to social issues. Students can give simple arguments for their viewpoints and in simple assessments evaluate the viewpoints of others.

C:
Students can also in detail give an account of human rights. In their analysis students explain relationships and draw well grounded conclusions about similarities and differences between the organisation of different societies. In addition, students can in detail give an account of the importance of historical conditions and draw well grounded conclusions on how contemporary social conditions, such as the development of working life, affect and are affected by individuals, groups and social structures.

Students can analyse social issues and identify some causes and consequences. In their analyses, students with some certainty use the concepts, theories, models and methods of the social sciences and evaluate them in simple assessments. Students discuss in detail causes and consequences, and also possible solutions to social issues. Students can give well grounded arguments for their viewpoints and in simple assessments evaluate the viewpoints of others.

A:
Students can also in detail and in a balanced way give an account of human rights. In their analysis, students explain complex relationships and draw well grounded conclusions about similarities and differences between the organisation of different societies. In addition, students can in detail and in a balanced way give an account of the importance of historical preconditions and draw well grounded and balanced conclusions on how contemporary social conditions, such as the development of working life, influence and are influenced by individuals, groups and social structures.

Students can analyse social issues and identify several causes and consequences. In their analyses, students with certainty use the concepts, theories, models and methods of the social sciences and evaluate them in balanced assessments. Students discuss in detail and in a balanced way causes and consequences, and also possible solutions to
social issues. Students can give balanced arguments for their standpoints and evaluate with balanced assessments the views of others.
(Skolverket 2012b, pp.10–12)
Results

Topic 1

Control Lesson Result

The students in the control lesson group (n=9) returned a range of change in grade steps from -2 to 8 when pre-test and post-test are compared. There was an average increase of 2.89 grade steps across the 15 questions.

Game Lesson Result

All students from the game lesson group (n=8) increased their result from pre-test to post-test by an average of 4.75 grade steps across the 15 questions, with a range from a low of 2 to a high of 6.

Comments from Focus Groups

Control Lesson Group:

Students commented on appreciating the creative nature of the task and also that it was a variation from “reading and studying”. Many of the students commented on the benefits of doing something visual and that they were forced to organise the facts into some form of structure which forced them to engage in the content and attempt to understand how it all connected to each other.

Game Lesson Group:

Students felt that the challenge of aiming for a high score couple with the fact that it was something other than listening to a teacher at the front of the classroom was engaging and motivating. Although they identified a risk in that some students may only be interested in the score and focus on that rather than learning the content. The game included explanations of the answers after every question, so even if they had answered incorrectly they could learn the correct answer and the reason for it. Students in this group also commented on their appreciation of doing something that was not a normal or common lesson, that although they would not want to play games all the time it was a good form of variation. Being able to play the game at least twice during the lesson was
also seen as a good form of reinforcement. One of the only negative comments was in relation to the topic in general, in that it was almost entirely based on factual knowledge and did not require any higher order thinking or analysis of any form which, as the student pointed out, is an aim of this course (and the Swedish School Curriculum in general).

**Analysis for the Presence of van Staaldruinen’s Game Elements for Learning.**

Six of the 25 game elements that van Staaldruinen (2011) has identified that contribute to learning can be found in the online board game Rixdax:

*Assessment/Feedback:* The game does score each player, winning points for correct answers and losing points for incorrect answers and at the end of each of the five sections the cumulative score of the player is compared to all others that have played the game. There is feedback after each question which provides the correct answer as well as some extra information, whilst this can be seen as helping with learning the knowledge content of the game, this is not feedback that will help the players improve their performance in the current game.

*Goals/Objectives:* These are necessary to define the “win condition” of the game, however in this game this is somewhat redundant as all players will make it to the end of the “course”, it will be the point score of the player that differentiates them.

*Instructions/Help/Hints:* There are very basic instructions at the start of the game, which are all that are necessary, in fact one could question their need as many or even all students would have played similar games as a child and would understand the basic gameplay of following a route and rolling a dice. Once the initial instructions are understood there is no need for further instructions on how to play the game, as each step is similar to the previous one.

*Progress:* The player is continuously aware of how far along the route they have progressed as well as the cumulative point score always being on display. As mentioned previously, at the end of each of the five sections a player’s score is compared to all others that have played the game.

*Rules:* This game, as with all board games, does have well-defined rules that allow the player to focus on the content rather than making decisions about the gameplay, although this is an aspect that can contribute to the less exciting nature of this particular game.


**Safety:** The results of the game have no bearing outside the game, and there is no way for anyone else to monitor a player’s score except for looking at their screen, this can lead to the student feeling safe when playing the game and be willing to risk making mistakes. There need not be any negative consequences for answering a question incorrectly or not achieving a high score at the end of the game.

**Discussion**

There was a greater increase from pre-test to post-test in the game lesson group, however this was not a significant difference (t-test = 0.123) thus it is hard to draw any conclusions that one lesson was better than the other. However, these results can be used to show that for this topic using a computer game was at least as an effective learning tool as the lesson that has been used in the course for the past few years. In both groups there were a number of students that answered to a lower level on the post-test than the pre-test which leads to an interesting dilemma, have the students reduced their understanding of the question during the lesson (which would be of quite a concern for any teacher), or have the students not given as much energy to answering the question as the pre-test as they were less motivated as the test had no bearing on themselves and only on this study. It can also be noted that this study was conducted in the last week of school before the summer holidays and, as all teachers have experienced, trying to motivate students to work during this time of year is particularly difficult. If the assumption is made that students can be no worse at the end of this lesson than before then negative grade steps between pre-test and post-test could be replaced by a result of zero. Even if this is done there is no significant difference (t-test = 0.094) between the average improvement of the game group (5.36) and the control lesson group (3.78). Making this assumption is not advisable as it is fully possible to create lessons that either confuse students or teach them incorrect facts, in fact this is a very real danger when students are given time to search for answers on the internet by themselves.

The six game elements identified in Rixdax can be seen as a low number, out of a total of twenty-five that van Staalduinen defined, which reflects the simple nature of the game. It is neither advanced nor complicated and in itself does not meet the understanding of what a constructivist learning tool would look like. It is however possible to use the game, as in this study, and create around it a framework for student activity that does include some elements of social constructivism. There is very little higher-order thinking required by the game and whilst this is the aim of modern teaching
students do still need to learn fundamental information regarding their topics of study if they are to be able to engage in more deeper understanding, discussion, analysis and reflection.

The student comments from the focus groups indicate that students appreciate activities that allow them to be active learners, as opposed to listening to the teacher. Although they also seemed to be aware of the limitations of this topic with regard to higher-order thinking and did state there reluctance to use games during lessons too often.

**Topic 2**

**Control Lesson Result**

A majority of students in the control lesson group (n=12) showed improvement from the pre-test to the post-test resulting in an average increase of 1.75 grade steps across the 3 questions.

**Game Lesson Result**

All students except one in the game lesson group (n=9) showed improvement in at least one (of three) question from the pre-test to the post-test. There was an average increase of 1.44 grade steps for all students across the 3 questions.

**Comments from Focus Groups**

**Control Lesson Group**

The students felt that a documentary was a good way to gain understanding of a real world issue through pictures and actual examples, combined with the narrator providing details and statistics that the students were previously unaware of. It also helped to present the issue from different perspectives and gave the topic a more real life feeling to it because it was presented in pictures rather than just text. The film conveyed the complexity of the problem very well and showed how difficult it is to do something about it. The students felt that they did learn whilst watching the documentary although they did not find it particularly stimulating, felt it was easy to become tired and lose interest, and probably would have been better if it was shorter. They felt that it was not the best way to learn facts but was good to gain a picture of the situation and maybe
something that could be used after a basic understanding of the topic had been developed. It was suggested that a game could be more interesting and engaging although that would of course depend on the game, and that games could be an acceptable way to learn.

**Game Lesson Group:**

Students thought the game was an interesting and enjoyable activity that was easy to become engaged in and felt that it was a good way to gain a practical understanding of an issue instead of only the theory or facts. The students felt that the game highlighted different perspectives and attitudes towards child labour from different stakeholders, and did this in a way that gave a better understanding for them than reading a book would have. One drawback of a game is the desire to rush through as fast as possible to reach the end, although working in pairs had reduced this temptation to some extent as pairs needed to discuss the next move before moving forward. The game ending was also brought up as a well-designed scenario to allow thought, reflection and discussion of the different issues and perspectives involved in the topic, for example the need to balance the ethical aspect with company perspective. The students that played the game felt that the game alternative required much more active participation than a one hour film documentary would have, they felt that it was easier to maintain concentration with the game than it would have been watching a documentary. Another positive aspect of a game compared to a film was the ability to proceed in the game at your own pace rather than the pace decided by the documentary director, although the students did comment on the differences between a film documentary and reading a book and thought that a documentary would be more enjoyable.

In response to the use of games in teaching in general the students were generally positive and provided suggestions for games to be used either as an introduction to gain the interest of students in a new topic, or as a conclusion to a topic in which the knowledge and understanding the had already gained could be applied. They felt is was one way to bring more variation to teaching and learning, which was an idea consistently brought up in all focus groups. It was also discussed that a game might not be able to provide the depth of books and that it may only provide a limited perspective of an issue; a documentary, on the other hand, can give real life examples with real interviews of real people. The students also talked about the need to develop trust for games as a reliable and valuable resource which, as using computer games in education is relatively new, might take time. They also commented on the advantage that education specific games
would have in this aspect as opposed to COTS which have been developed with game play and profit in mind rather than strict adherence to historical or current facts. None of the students could remember using computer games in school previously, but they did suggest that they could be either used as a break from other activities in the classroom to provide variation or as a tool that could be used at home so that classroom time could be focused on the teacher helping the students with their learning.

Analysis for the Presence of van Staalduijnen’s Game Elements for Learning.

Nineteen of the 25 game elements that van Staalduijnen (2011) has identified that contribute to learning can be found in the online role-playing game Global Conflicts: Sweatshops.

Action-Domain Link: The Sweatshops game is built around first gathering in-game information which the player should then use during the final scene interview to present strong arguments to improve the situation for child labourers. Two links can be drawn to the real world, one is content based in that the issues presented in the game mirror some of the issues surrounding child labour in the real world, the other relates to the process of forming strong arguments based on information and facts rather than just feelings and opinions.

Adaptation: The level of difficulty does not adjust to the skill level of the player, however it does increase throughout the game as more options are given in conversations later in the game and the final interview is the hardest of the tasks encountered in the game.

Assessment/Feedback: The players aim to collect pieces of information during the first part of the game in preparation for the final interview with Raihan (the factory owner), the gathering of these pieces of information can be seen as steps forward in the game and when they are found the player is made aware. Also, during some of the conversations there is an indicator indicating the level of trust or pressure between the player and the game character, this feedback helps the player understand if the conversation is going well or otherwise.

Challenge: There are two stated goals in the game: to investigate claims of child labour at the factories that supply the player’s company, as well as look at child labour and poverty from a more general perspective in terms of CSR (Corporate Social Responsibility). The challenge is to find the (unknown number of) pieces of information through looking around the locations and during conversations with in-game characters.
Conflict: Each conversation that the player conducts can be viewed as a conflict in which the player needs to carefully choose what to say in order to gain the maximum amount of information and understanding.

Debriefing/Evaluation: A debriefing session is not a requirement of this game however the producers of the game do provide after-game activities for students to complete, some of which focus on what happened in the game and some that focus on looking at the real world situation (Serious Games Interactive 2010a). Players can be evaluated in the pairs they played based on their score at the end of the game that, combined with the after-game activities, provides an excellent basis for post-game evaluation and debriefing.

Fantasy: The content in Sweatshops is immersed in an endogenous manner which leads to the flow of the game not being interrupted by the content (Gunter et al. 2008, p.517).

Goals/Objectives: The objective of the game is to gather as much information as possible about child labour before a final interview with the owner of the factories, this objective provides the in-game motivation for the player to visit the different locations and talk to the various in-game characters. The game objectives are absolute (unchanging) and can be closely related to learning objectives of the Social Studies 1b course.

Instructions/Help/Hints: The game includes a number of pop-up windows at various stages that help to explain or introduce new aspects of the gameplay. As well, there are instructions at the bottom of the screen as to what the player should try to achieve next. A “book” is also included which contains all the background information to the scenario and the character the player controls, as well as saving the pieces of information the player has found in-game and a simple instruction manual to help players through the game.

Location: Sweatshops takes place in Bangladesh, a location that realistically allows the presence of poverty, factories and child labour. The character the player controls is not from Bangladesh and this fact is made clear during many of the in-game interactions which adds to the authenticity of the gameplay, as the students are not from Bangladesh this can help contribute to accepting the fantasy of the game.

Mystery: Whilst there is some mystery in the game, the pieces of information to be gathered are unknown, the main question of whether child labour exists or not would seem to be less of a mystery – a game designed for use in education and then presented by a teacher during a lesson is most likely to contain and deal with the topic in question. If the point of the game is to help students understand the issues of child labour and
poverty then the game would not function as well as a learning tool if there were no evidence of child labour.

**Pieces or Players:** The different characters in the game contribute to the gameplay, the win condition and the learning objectives and are thus pivotal.

**Problem-Learner Link:** *Sweatsshops* relates to students in that the main topic of child labour deals with subjects that are of a similar age as the players, there is also the possibility of making the connection to consumer products that the students buy that may have been manufactured in similarly poor countries (although not necessarily with the use of child labour).

**Progress:** The player is notified when they have collected pieces of information, and the hints at the bottom of the screen indicate when it is time to move on to the next part of the game, including when it is time to go to the final interview.

**Rules:** The rules of Sweatshops are quite rigid and defined, the player does not have the ability to explore locations not pertinent to the game objective nor talk to non-essential characters, also there are limited options as to what a player can say during a conversation. The rules of gathering information and forming final arguments also determine the win criteria, although these might not necessarily reflect the knowledge and arguments of the player in the real world.

**Safety:** There is a high degree of safety within the game, as a learning tool it is designed to support student learning so there are many hints and helps during the game to increase the likelihood of the player achieving at least some degree of in-game success. The relative success or failure of a player in the game has no consequences in the real world and, with the after game activities suggested in the support material provided by the publisher of the game, a less successful game does not necessarily need to impact negatively on the learning outcomes for the students which are ultimately the aim of the game.

**Scope:** The scope of *Sweatshops* is limited to four locations and conversations are only possible with characters pertinent to the storyline. Whilst this might be a detrimental attribute in a COTS game, for an educational game this removes distractions for the learner and provides more focus on the in-game tasks and learning objectives.

**Sensory Stimuli:** There is a constant use of background sounds and noise linked to the specific locations that the player finds themselves in at the time and all conversations provide both written and spoken text, this is presumably to enhance the endogenous fantasy of the game and to try to “tap into the player’s emotions, allowing for a
(temporary) acceptance of the games’ reality (fantasy, location, theme) by the player” (van Staalduinen 2011, p.106).

Theme: The Global Conflicts series of games are all thematically driven experiences that have been placed in specific locations to exemplify the theme. In the case of Sweatshops, the theme of child labour is set in Bangladesh although could have easily been placed in another country with a similar socio-economic and industrial situation. It is the theme of the game that is of utmost importance rather than the actual location; the theme is directly linked to the learning objectives identified by the game’s producers.

Discussion

There was a marginally greater average increase in the answers from the control lesson group, however this was not statistically significant (t-test = 0.289). In this part of the study there were no students who wrote poorer answers on the post-test than on the pre-test, in contrast to the first topic. This could be due to the questions requiring more descriptive answers, the fact that there were only 3 questions for this topic as opposed to 15 for the previous topic, or even that the study was conducted a week earlier than the previous one whilst students were less influenced by the “summer holiday” attitude. As there was no significant difference between the improvement of the game lesson group and the control lesson group, this topic study could also be taken as an example of computer games being as good as a more traditional lesson, in this case a TV documentary.

The focus groups brought up, in common with the topic 1 groups, their preference for active lessons, which in this case referred to the game, rather than a passive lesson exemplified by the documentary. The game groups took up the issue of bias and reliability in the game, and felt that it was important to use respectable sources for games used in education, although students did not exhibit the same degree of critical thinking with regard to a film documentary. There seemed to be a tendency to accept interviews and pictures in a documentary as truthful and representative of reality, displaying less evidence of student understanding of bias in filmmaking. When the students did discuss the importance of the reliability of information presented in a computer game used for education this was said on the assumption that games would be used to teach content. There is of course the possibility that games could use fiction content to teach actions, analysis, reflection and thinking.
The nineteen game elements identified in *Sweatshops* is reflective of the immersive role-playing game that it aims to be, and probably also due to the academic research background of the company that produced the game and in particular the CEO Simon Egenfeldt-Nielsen; see for example Egenfeldt-Nielsen (2006), Egenfeldt-Nielsen et al. (2008). Many of these game elements contribute to the constructivist nature of the learning experience had by students playing this game, including the social aspect of these theories when following the game-makers advice on students playing the game in pairs. In fact, the process of discussion necessitated by working in pairs was a positive aspect brought up by the students in the post-game focus groups.
Discussion

The results from the current study would indicate that both of the chosen games are appropriate substitutes for lessons that have been previously taught for the specific topics. Students seem to appreciate the variation in teaching, of which computer games can contribute to, as well as the active nature of the learning tasks. It is interesting to note the difficulty in finding education-focused games that require higher-order thinking, which is likely due to the relative infancy of a computer gaming industry for education. The development of this industry is hampered by the many different education systems, with different aims, goals and content, in countries around the world; whereas the commercial gaming industry needs to only be concerned with what will sell based on player interest and engagement.

Comparing the two games used for this study it becomes obvious, as evidenced by the difference in the number of game elements found in each, that there is an entirely different level of quality of production and resulting increase in the opportunity for deep learning, as according to van Staaldruinen (2011). It can be hoped that in the future more games for education will provide the opportunity for deep learning rather than drill-and-repeat style activities. As Sweatshops demonstrates, computer games present the ability to place students in environments and situations that they otherwise may never come into contact with and allow the opportunity to interact with and in these environments. It can be hoped that game developers move from single-player role-playing games to multiplayer games so that the ideas of social constructivism can be built into the games as well as how the games are used in the classroom. Whilst games should not be seen as a replacement for all teaching and learning, studies such as this one demonstrate that teachers with careful planning can use them as an effective learning tool.

The students that participated in the study displayed a fairly similar usage of computer games as the statistics provided by the Swedish Media Council (2010). This would indicate that the results from this study would not vary from other groups, classes or schools in Sweden as a result of the familiarity of students with computer games pre-study. The gender balance in the classes was not even, particularly in the topic 1 group, although a majority of female students is not an uncommon occurrence in Social Science programme classes in Sweden (SCB 2012), which is the programme that the topic 1 group is studying. At the school used for the current study there is historically a greater
percentage of females that enrol in the school based on their grades from junior secondary schooling.

The current study was conducted during the last two weeks of a school year, which could certainly have influenced the results, however due to the leader of the study also being the teacher of the groups it was felt that the students did take the lessons seriously. The subject matter for topic 1 had already been covered in the course, although at the beginning of the school year, which would presumably have led to a higher pre-test score than before the topic had been covered at all. Despite this being the second time the students had studied the topic the pre-test scores were not, on the whole, that great, so it would seem that much of the factual knowledge of the subject matter had been lost. The advantage for initial studies in this area, such as this one, being conducted at a less serious and stressful time of year is that teachers and students will not be as worried about the danger of a game failing to produce as effective learning as the established lesson. Although hopefully now, with the results of this study showing no significant difference between the results of the two lessons, there will be more willingness to try and test games during all times of the school year.
Conclusion

The primary objective of this study was to investigate if it is possible to use computer games as learning tools in secondary school social studies. This is a highly relevant topic given the attention and discussion given to the need for reform (or even revolution) in the current education systems to be more adapted to preparing students for the rest of their lives in the 21st Century. Since the development of the computer there has been a noticeable increase in the ownership and use of them, as well as their visibility in educational settings. Games and play are established teaching methods so the step to combine them with current technology in the form of computer games in the classroom is not a great leap. Yet whilst there is much talk of this, and many examples of the use of, and possibilities for, computer games in education there has been comparatively little empirical evidence as to their usefulness or otherwise. Also connected to the discourse on 21st Century skills is a move from traditional lecture and content based teaching towards learning experiences that are modelled more closely on the ideas of, among others, social constructivism. Computer games can certainly be incorporated into a social constructivist classroom and arguably have the potential to enhance them dramatically.

This study had three sub-questions that formed the framework for the research:

a. Are there any suitable games?

b. Are there measurable effects?

c. How do they compare to other teaching tools?

In dealing with the first question the short answer is yes, however this hides the fact that this study did experience difficulties in finding appropriate games. The market for educational games is understandably small, and not as lucrative as the commercial market, a fact that could be limiting the development of high quality games. The study did however find two games to test and was able to measure effects from pre-lesson to post-lesson. These effects were not significantly different from an alternative, or more common, lesson. This in itself does not need to be viewed as a negative; showing that games can be at least as effective as alternatives is a positive result in itself. As well as being as effective as established lessons, using computer games can provide other benefits such as increasing the ICT use in learning and providing variation in teaching practice, which was a positive attribute raised by participating students.
The current study contributes a small amount of empirical data to a field that is greatly in need of more. Further research is needed to investigate the effectiveness of using computer games in teaching and learning in comparison with other lessons, where the effectiveness should be based on the aims and goals of the education system in question. This research should be conducted to aid teachers with developing new methods for classroom practice. After all, the purpose of this study was to try to aid teachers in deciding if and which computer games may be suitable in a social studies classroom. In conclusion, the ICT landscape in education is developing rapidly and computer games can be one part of this therefore it is of paramount importance that empirical research accompanies the theoretical, the speculative and the sometimes almost evangelical writings about the power of computer games.
**Recommendations for Teachers**

Teachers that wish to investigate the possibility of using computer games as a learning tool in their classroom need to be prepared to invest some time in looking for and testing appropriate games, however this process of preparation is common to all new lessons. It is important to develop and use teaching methods and learning tools that allow students to develop opinions on complex societal issues based on a deep understanding from the perspective that there is neither a simple explanation nor a simple answer. Developing this form of learning environment takes time, regardless of which tools are being used, but this is necessary if education is to meet the challenges and goals discussed in relation to 21st Century education. For teachers wishing to use computer games, the game elements for learning, as described by van Staakduinen, provide a clear framework with which to assess games for their ability to provide opportunities for deep learning and can be used to guide the choice of games. The current study encountered difficulties in finding appropriate games but was greatly assisted by the growing “serious games” and “games for education” movements that are constantly sharing information on Twitter and blogs, which would certainly be a good place to start when looking for new games to use. As was demonstrated in this study, even if games are not constructive in their nature it is still possible to design their use in the classroom in ways more in keeping with constructivist learning theories. It is also always worth bearing in mind that very often the students in the classroom can provide great ICT support and knowledge, which should be seen as a resource rather than a threat as it can help the teacher and give students the chance to excel. The author of this study is in support of greater ICT use in teaching and learning, although it should not replace established methods merely for the sake of it. Education systems are in need of reform, and indeed maybe even revolution, if they are to successfully equip students for the future they will meet and it is the belief of this author that computer games do have a part to play.
Reference List


