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Gaming in Education: Using Games as a Support Tool to Teach History

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Abstract
The use of current and emerging tools in education is becoming a blistering topic among educators and educational institutions. Gaming in education may be viewed as an interference to learning but its role in education is to increase students' motivation and engagement, to enhance visual skills, to improve students' interaction and collaboration abilities with their peers and to enable them to apply gaming values in a real-world situation. Educational technology is being used to simplify and improve learning but using technology in education does not directly impact student achievement as the technology tools have to be in line with the curriculum for them to be effective. This paper discusses the implementation and use of gaming applications in teaching History, a subject which is mainly concerned about facts, by highlighting the role games have in education. The design of games such as word search, crossword, jigsaw puzzle, brain teasers and sliding puzzle using an open source tool called ProProfs is also discussed in this paper.
Keywords: Achievement, Educational technology, Gaming, Simulations

1. Introduction

A game is a type of play where participants follow defined rules. (Houghton et al., 2013) discusses educational games as the utilization of games to support teaching and learning. Games can be used as a support tool to complement traditional teaching methods to improve the learning experience of the learners while also teaching other skills such as following rules, adaptation, problem solving, interaction, critical thinking skills, creativity, teamwork, and good sportsmanship. Learning should not feel dull and it should not only mean rote memorization where students learn and grasp concepts through repetition or cramming. Teachers can take advantage of the energy and innovative thinking that is provided by using technology in learning to improve student performance.

1.1 Aims

i. To develop an enthusiastic learner.
ii. To motivate and engage students.
iii. Reduce monotonous learning methods.
iv. To help students with focus, self-esteem, and memory.

1.2 Limitations

Limited time to experiment. Using open source applications – Moodle is an open source application which offers a demo mode where teachers can edit and upload content. The demo period expires after 60 minutes and all content will be reset. ProProfs is also on open source application with restrictions which limit the application development process.

1.3 Overview of Games in Education

Many different types of educational games are being applied and used in educational institutions, schools and homes. Using games in education mostly focuses on improving critical thinking skills while teaching a particular subject, by allowing students to think outside the box as they follow rules. There are other games that can be used which limit to improving knowledge in a specific subject and the most popular ones are math games. (Yue, & Zin, 2009) discussed that games like chess cannot be viewed as educational games as these improve logic skills, reasoning, and other traits valued in education but they are not considered educational because they do not deliver content or relay curriculum material. Games that incorporate curriculum content or other educational material are referred to as educational games (Michel, 2016).

1.4 Roles of Games in Education

(Boyle, 2011) posits that games play a vital role in building students' self-confidence. As educational tools, games are constructive as they liven up teaching methods which are normally considered dull and boring.

1.4.1 Advantages of using Games in Education

i. Engage students

The major role of applying technology is to engage students and to encourage students to participate. The use of games in education plays an important role in engaging students by encouraging a hands on approach.

ii. Help students remember

The use of games in education aims to help students remember what they have learnt as active participation is encouraged. Learning should not mean rote memorization but students can use games to remember the critical points which they can apply in their examinations as well as in real-world situations.

iii. Visual and computer literacy

This is something which is vital in light of the fact that we live in a world which is ruled by innovation. By playing games, students gain visual and computer literacy skills which will prepare them for the world of work.

iv. Rule following and problem-solving skills

Game drills are based on rule following and students are required to follow rules inorder to achieve a high score and move to the next stage. Students can easily apply this knowledge in real world situations as they are encouraged to think outside the box.

v. Beneficial for students with attention disorders

Using games can help capture students attention as this is considered to be a fun way of learning. Research conducted has discovered that web based games can assist kids who experience attention problems.

vi. Teach other skills

Games can also be used to teach other skills such as critical thinking, problem solving, sportsmanship, interaction and collaboration with peers. This helps in creating less stifled individuals who are not limited but can adapt to any real world situation.

1.4.2 Disadvantages of using Games in Education

However, gaming in education has setbacks which need to be addressed.

i. Providing a platform for students to play revision games becomes a challenge when teachers or instructors cannot control such an environment. Students can have access to other platforms which are harmful.
ii. Students who rely on games are often secluded from real life interaction.
iii. Using computers and other electronic devices can cause health hazards such as eye strain and other physical problems.
iv. The technologies required for full participation can be quite expensive and this can create a gap between the students who have access to the technologies and those who do not have access.

The diagram below summarizes the role of games in education.

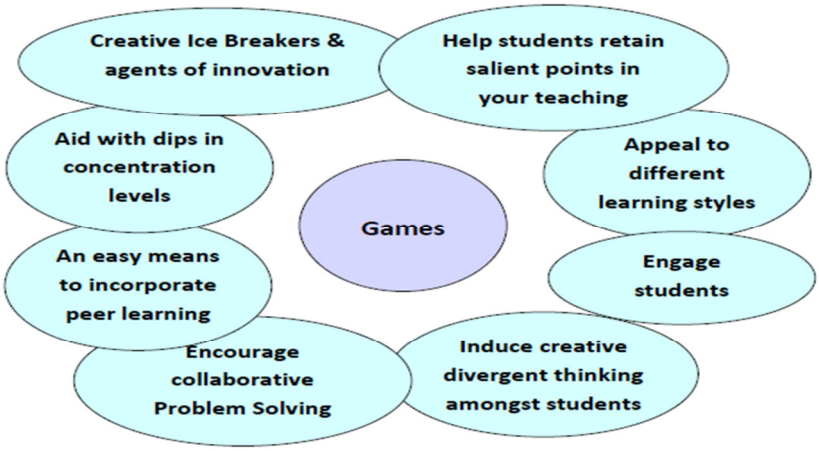

Fig 1: Role of games in education (Boyle, 2011)

1.5 Teaching History

The nature of History as a subject makes it necessary for current and emerging tools to be introduced to support the main delivery of instruction. History is a subject that deals with facts which need to be remembered as they are, as compared to subjects like Mathematics and Science which seem to be more important. The way History is viewed as a subject of little importance in the world will affect the way students view the course and they might not feel the need to learn in order to grasp terms and concepts but to learn just so they can do well in the exam and forget about the course. Applying gaming theories in History will enable the students to see the course in a different way as History offers more than an update of past events. The need to engage students in such a course is becoming more apparent so that students remember what they learn even for future purposes.

The aim of adding History module to Arts students in their final year of undergraduate studies is to ensure that the graduates have no challenges in securing gratifying jobs in a wide variety of occupations such as news reporting, child psychology and graduates can also expand into careers in finance, business, and consultancy in law and public administration, journalism broadcasting, and also in teaching and research

depending on the majors they select.

2. Literature Review

(Aleson-Carbonell, & Guillén-Nieto, 2012) discussed the importance of games in education is indisputable as the potential advantages of utilizing instructive recreations to supplement customary classroom direction are certain. (Burke, 2016) discussed the quick infiltration of progressively refined advances into each feature of society is bringing about noteworthy movements in how, when, and where we work, how people, organizations, and even countries comprehend and compose themselves, and how educational systems ought to be organized. (Charsky, 2010) portray how edutainment and instructional PC games where seen as the friend in need of education on account of their capacity to at the same time educate and entertain.

There are complexities involved in identifying and classifying games that can be used for education. Some perspective them as a continuum (Aldrich, 2009), while others see every one of them as various classes of the similar thing (Hendrix, & Backlund, 2013). (Boyle, 2011) highlighted that as pedagogical gadgets, games are greatly valuable as they can charge instructing points and are particularly successful for developing the basic intellectual abilities of the learners. Games have an unique part in building students' self confidence and they can lessen the gap amongst quicker and slower learners.

In any case, the effective application of learning theories in higher education has an impact on student performance. According to (Ben-Ari, 1998) constructivist practices in computer science education put the desires on students to find information without anyone else's input when put in the suitable circumstance. (Bi, 2013) asserted that learners build new information from their encounters through the procedures of settlement and osmosis. Truth be told, osmosis is the procedure of fusing new learning into a current schema while settlement adjusts to accommodate new knowledge . For instance, (Ben-Ari, 1998) found that information is obtained recursively: tangible information is consolidated with existing learning to make new cognitive structures, which are in turn the basis for further development. Information is likewise made intellectually by thinking about existing learning.

The primary rule to make educational game's plan is the recreation of motivation. The arrangement of educational games s is to make particular undertaking for accomplishing the educational games goal objective, so as to ensure educational objective can use in the educational activity, having the coordinating part in the instructive procedure. The principal thing to make educational games arrangement is to assemble the educational reason, making the educational reason concrete, furthermore, and isolate the games. (Johannesson, & Lundqvist, 2012)

2.1 Learning Theories

According John Dewey's (1859-1952) Social Activist Theory he trusted that learning ought to be hands on and learners ought to be experienced through numerous exercises. Learning as social experience and hands on (Conner, 2011). Social Activism is predominantly centered around the learner's close to home inclusion making meaning and request inside their own learning as they communicate with a particular learning environment. According to a quote by Johan Huizinga "*Let my playing be my learning, and my learning be my playing,"* also supports that learning and playing should not be different because learning should be equated in the same way students enjoy having fun (Roblyer, & Doering, 2013). In line with Games for History creating that optimal condition through providing a fun environment would aid with a positive effect and learning made entertaining. Learning is supposed to meet students where there are for it to be effect and in this case through these games we will be bringing education to the fun they are usual as well. Discovering that happens is credited to how well the students are propelled. Based on this theory, if students are motivated they will be successful in school (Petkov, & Rogers, 2011). Even though teachers are no strangers to using games (board games, card games , and role-playing games) in the classrooms, the essential purpose behind utilizing them has dependably been for learning and not for stimulation. When used within a classroom setting, games functioned as a teaching aid in helping to explain or reinforce a learning concept. At most times, using games in education may help to simplify matters (Van Ments, 1999).

2.2 Game development process and tools

(Michel, 2016) posits that games are therefore defined voluntary and hence clashes with the idea of "serious games". Moreover, even if having fun can be seen as a futile activity, individuals develop a strong submersion and focus skill. Vorderer, P (2009) A phase of professionalization in simulation games has been taking place since the 2000s. Games are again being utilized in professional training, yet broaderly and not only for gaining technical skills. Serious games can therefore be presented as technology advancements and computer game stages which have objectives other than simple entertainment. (Rheingold, 2000). This virtual experience would go for reengaging learners through a hyper-genuine ordeal.

2.3 Game Theory

In the In about the same period when Wittgenstein was building up his hypothesis of Sprachspiele (literally, language game), Nicholas Von Neumann delivered diversion hypothesis, a half and half field between programming designing and money related angles.The game theory, which is a theory of communication that models complex social interactions (among which likewise some games which are frequently utilized as illustrations), was later extended and formalized by John Nash (Hacker, Glock, & Hyman, 2009). Games are categorized as collective and focused challenging games, in which players carry on as specialists who take after standards of the game and move in turns. Game theory is usually applied to depict conflicts or market dynamics. Inside game theory, the supporting components of a game exist as guidelines, turns, cooperation and rivalry, where winning, or fun, is demonstrated as numerical result. Game theory tries to clarify how playing (a game) functions, and characterizes recreations as an intuitive procedure endeavoring toward a result. Because game theory provides a phenomenical description of a game *for example, what happens during the game* without investigating the meaning of the game *for example, why do we play*, we will label its approach as functional approach (Jackson, & Morsi, 2007).

2.4 Instructional Design

In the 1950s, for the most part when instructional outline *ID* was set up from a field of media experts, instructive clinicians and mechanical and military coaches, instructional planners shrank Tyler's reason to fit the demonstration of direction. (Ben-Ari, 1998) instructional planners devised an *ID* method of reasoning:

i. For whom is the project created? *Qualities of learners or students*
ii. What do you need the learners or students to learn or illustrate? *Goals*
iii. How is the subject or ability best learned? *Instructional techniques*
iv. How would you decide the degree to which learning is accomplished? *Assessment techniques*

3. Methodology

This project was based on secondary data collected from various sources. Data was compiled from different books, journals, research papers and other printed media on the use and relevance of games in education. A gaming application was also designed by reviewing the design of revision based question games.

3.1 Tools Used

ProProfs Build and Test Knowledge is an open source application that was used to design the educational game. ProProfs was founded by Sameer Bhatia with the main purpose of building and testing knowledge is an online platform for instruction and evaluation. It allows for sharing tools and online education and this online tool offers study guides, practice tests and quizzes, and articles for certification exams. ProProfs.com is a Web 2.0 tool that grants instructors to make quizzes, surveys, flashcards , and games. Users can collaborate and share knowledge with the millions of users that use the site.

Moodle.net is an open source environment which facilitates e-learning. This application was used to make the game accessible by sharing the link to the game on the portal which students can access by entering their log-in details.

4. Design

The gaming application was developed using an open source game development application called ProProfs Build and Test Knowledge. Teachers and educational institutions can easily create online evaluations to enhance the learning experience of learners as ProProfs supports technology use in education by offering an easy way to create games that are in line with the curriculum to improve student achievement and not just offer fun and entertainment to the learners. ProProfs also has a commentary section at the bottom of the page where students can leave their comments after they have played the game and this will help educators to know the areas they still need clarification on so that these areas are discussed in depth.

4.1 Games Designed

ProProfs offers a platform to create and share games which can be hosted on a blog, website or social network. Games such as word search, crossword puzzle, jigsaw puzzle, hangman, word scramble, sliding puzzle, brain teaser, quiz games can be created using this open source game development application.

4.1.1 Word Search

A word search is a word find or word seek puzzle which consists of words placed at random in a box. Using word search to teach History involves using key terms that students have to know and remember. Students can discuss about the words in the comments section that is found at the bottom of the page to define and find meanings of these key words. When creating the word search, different difficulty levels such as easy, medium or hard can be selected and the maximum time allowed can be changed based on the level selected. While also

learning History, other skills such as rule following can be learnt as students have to follow rules and find all the words in the given time frame to attaining a good score. The diagram below shows how the key words are entered into the type words text box, and the instructor has to enter the game title, description and choose a difficulty stage as well as the time permits. These parameters can be changed to suite the different topics that will be covered in class, as this word search is a support tool for face to face instructional methods.

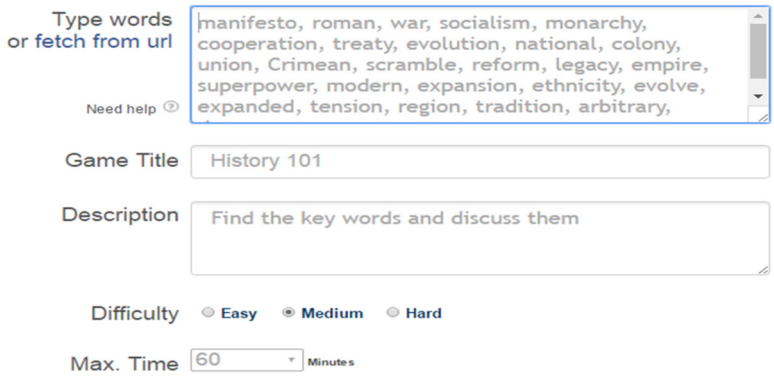

Fig 2: Word search design (Behatia, 2016)

The diagram below shows how the word search will appear after the design. Students will be given instructions to follow and the list of the words to find in the grid. When a wrong entry is made, the highlight will be in red and a message box with the message "*no match found, try again!*" appears. When the correct match is made, the highlight changes from red to green and the word is crossed out from the word list. A comment box is found at the bottom of the page where students can discuss the key words they have found in the grid and students can share their scores on their Facebook or Twitter accounts.

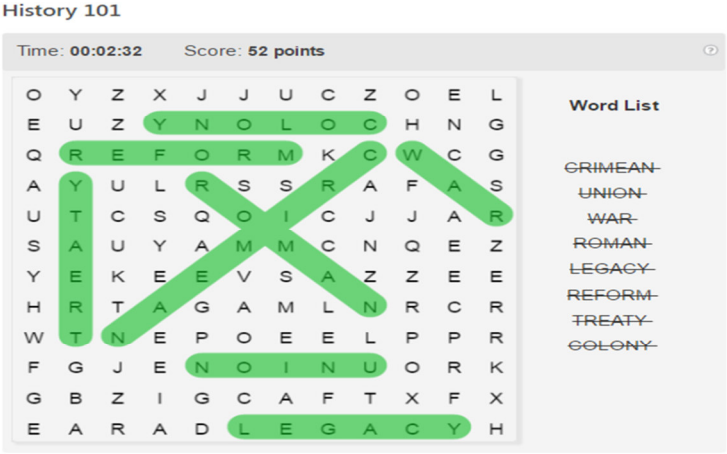

Fig 3: Word search example (Behatia, 2016)

A how-to-solve tutorial is found at the bottom of the page. ProProfs offers word search tutorials and tips to make it easier for the students to find the words hidden in the grid. The tutorial is defined below:

ProProfs Word Search Instructions:

- Click and drag on the different words until all the words hidden in the puzzle have been crossed out. Drag pointer until all letters in the word are highlighted.
- Continue to click and drag on the words until all the words have been crossed out.
- Words may be expressed diagonally, vertically, backwards and horizontally.
- The score will be higher if all the words are found faster Highlighting the wrong group of letters deducts points.

4.1.2 Crossword

Crosswords are the most popular games which are in widespread use over the world. They are mostly common in newspapers and magazines for general knowledge testing. A crossword is a word puzzle that has to be filled in by solving the clues that will be provided. Across and Down clues will be given to students on the most important events in History based on the topic that will be covered during face to face teaching and the students have to fill in the words or phrases by following the rules and within the given time limit. This does not only improve their knowledge of the subject but it also increases their visual literacy skills.

When designing the crossword, only the word and the clue are required for the application to create the across and down section. The revision aspect of learning History is supported by using crosswords as only clues

will be provided and the students have to figure the rest out by themselves. Each topic will have its own crossword with different difficulty levels as well. The diagram below shows how the crossword was designed using ProPofs online designing application.

Word	Hint
FRENCH	1789 _ Revolution begins; fall of the Bastille
DECLARATION	1776 American _ of Independence
LOUIS	1774–1793 Reign of _ XVI in France
JAMES	1769 _ Watt invents the modern steam engine
BERLIN	1885 _ Conference on Africa
NEWCOMEN	1711 _ invents early version of steam engine
CONGRESS	1815 _ of Vienna
DECEMBRIST	1825 _ revolt in Russia
SLAVERY	1833 _ abolished in Britain
CRIMEAN	1854–1856 The _ War
GERMAN	1871–1918 The _ Empire

Fig 4: Crossword design (Behatia, 2016)

When a student selects the crossword puzzle, a "*how to play*" link will be placed at the top of the puzzle which produces the message box shown below. This link shows the step-by-step tutorial that shows how to play the game in an easy and understandable way.

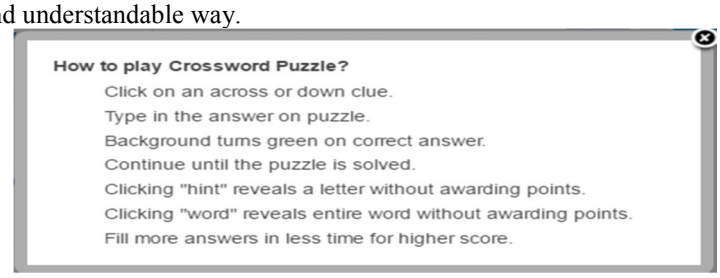

Fig 5: How to play crossword puzzle message box (Behatia, 2016)

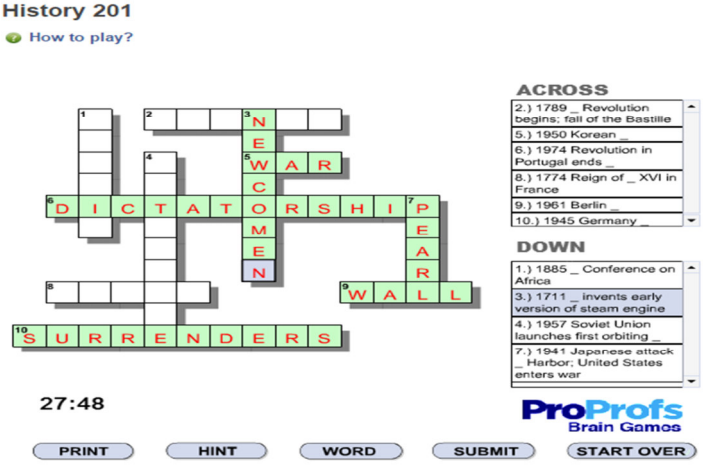

Fig 6: Crossword puzzle (Behatia, 2016)

The diagram above shows how the crossword puzzle looks like as a student is participating. There are numerous choices accessible for the student, the student can tap on the how to play link for an orderly instructional exercise on the best way to play the crossword. The student can likewise tap on the clue catch to get further clarity on the piece of information. At the bottom of the crossword is the timer whereby the student has to complete the crossword within the set time limit in order to get a high score to move to the next level. At the bottom of the page, there is a comments section which allows the student to discuss key areas and this will help in evaluating the usefulness of the game in learning History.

Students can also save their scores and view their certificates. When students click on the submit button without attempting to fill in the crossword, the crossword will show all the words in red as shown in the diagram below and it will give a score of Zero (0).

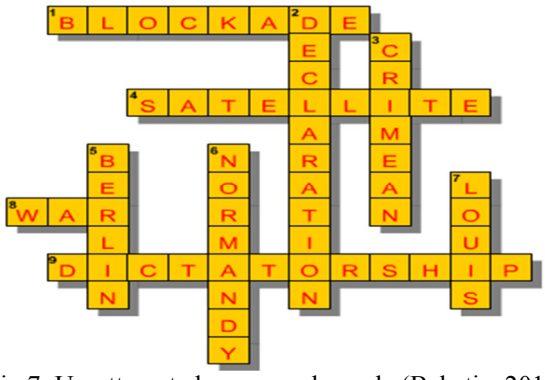

Fig 7: Un-attempted crossword puzzle (Behatia, 2016)

4.1.3 Sliding Puzzle

A sliding puzzle is a tile puzzle that challenges a player to slide pieces along certain route to rearrange the image into its original format. As History is mostly about facts and details of the Presidents who have made an impact especially during the different war eras, this type of puzzle will help students revise and recall in a pictorial format. The comment box at the end of the page will allow students to discuss the symbolism of the image they would have solved.

Students are most likely to remember and come exam time, they are likely to perform well as this type of instructional tool encourages them to participate and it fosters collaboration and interaction with peers. The diagram below shows the steps involved in designing the sliding puzzle. The teacher selects and uploads the image based on the topics covered in face to face instructional method and gives a description of the discussion topic. The design stage also offers a way to select different difficulty levels.

Fig 7: Sliding puzzle design (Behatia, 2016)

The diagram below shows how the puzzle will appear together with the instructions the students will be given on how to solve the puzzle. The How-to-play tutorial is found at the right hand side of the puzzle, together with the original image which makes solving the puzzle easier. The discussion question will be posted at the bottom of the puzzle and students can use the comments section to discuss the questions posted.

Fig 8: Sliding puzzle with how to play instructions (Behatia, 2016)

When students solve the sliding puzzle, marks will be awarded and students should be able to identify the symbol or person in the image and answer the discussion questions that will be posted below the image.

4.1.4 Jigsaw puzzle

A jigsaw puzzle is a puzzle made of numerous pieces that are cut into different shapes and can be fit together to shape a picture. Developing a complete learner with visual, technology and knowledge literacy is the goal of using technology in education. Jigsaw puzzles are an ideal tool to teach students various skills while also teaching then the content.

The diagram below shows the steps involved in designing the jigsaw puzzle. The teacher selects and uploads the image based on the topics discussed and gives a description for the discussion question which students need to discuss after they have solved the puzzle. Different difficulty levels can be selected based on how the students want to challenge themselves.

Fig 9: Jigsaw puzzle design (Behatia, 2016)

When students select the jigsaw puzzle, a "*how to play*" link is found on top of the puzzle and students can click this link whenever they feel they need clarification on how to solve the puzzle. The message box shown below is what appears when the how to play link is clicked.

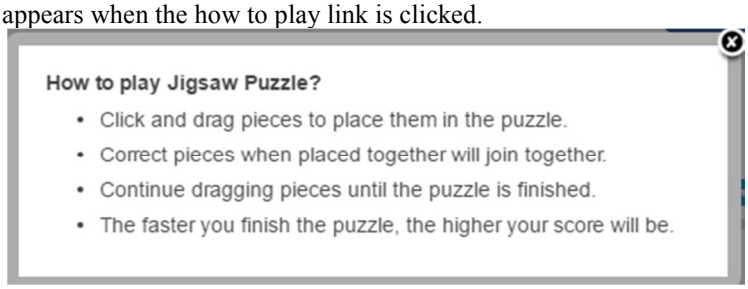

Fig 10: How to play jigsaw puzzle message box (Behatia, 2016)

Fig 11: Play jigsaw puzzle (Behatia, 2016)

The diagram above shows how the puzzle will appear after the design stage. Students will be given a time limit based on the difficulty level selected, and they will have an option to reshuffle or preview the image. A discussion question will be posted at the bottom of the page and students can discuss this question in the comments section. When the jigsaw puzzle is solved, students can share their scores with their peers on their social networking sites. The less time used to solve the puzzle, the higher the score a student can achieve. After the student has received their score they can go on to discuss the discussion question posted below the puzzle.

4.1.5 Brain Teaser

A brain teaser is a type of puzzle that triggers the thinking process in students. It gives students the chance to use their brain in unconventional ways by giving riddles or clues, hence, brain teasers are quizzical in nature. These offer the best platform for revising History towards examination period. The diagram below shows how the brain teaser is designed.

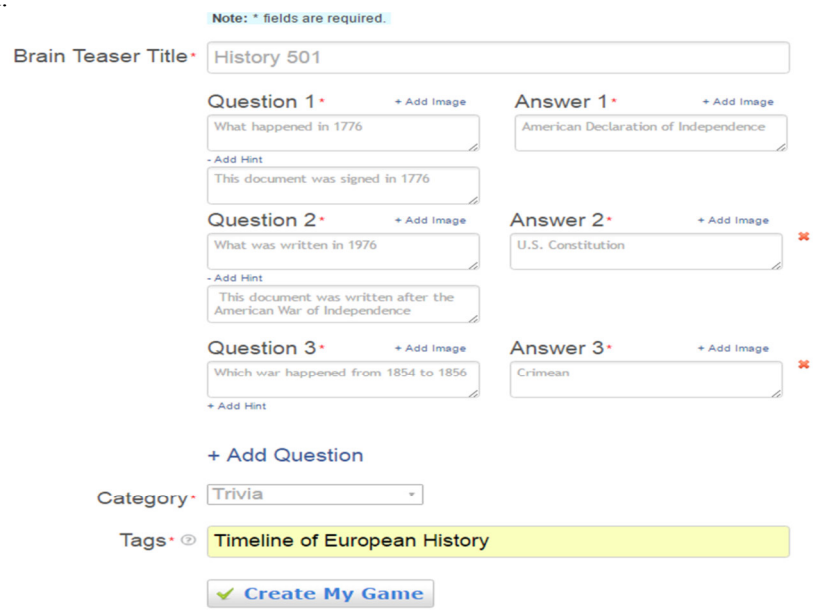

Fig 12: Brain Teaser design (Behatia, 2016)

Quiz type of questions will be used to discuss and revise the course at the end of the school term. This is a trivia type of game that will help students revise and focus on the key terms to help them remember what they have learnt. Students can also discuss the key terms at the bottom of the page and they can also ask for hints based on the clues the teacher would have provided. The diagram below shows how the game will appear to the students after it has been designed. A how to play link gives the students a step by step guide on how to play the brain teaser. Students can also click on the *Hint* link to get a clue which would have been provided by the teacher during the design stage. The hint further explains the subject to help students to solve the question without looking at the answer.

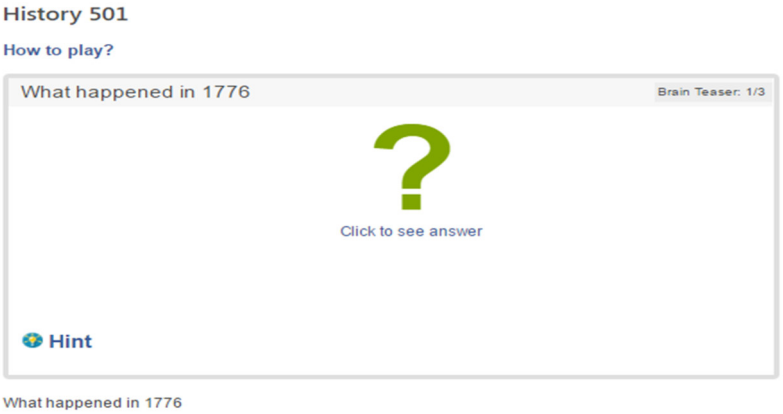

Fig 13: Play brain teaser (Behatia, 2016)

5. Implementation

Moodle (Modular Object-Oriented Dynamic Learning Environment) will be used to make the game easily accessible. According to (Robb, 2004), Moodle is a dynamic learning environment which can be used to balance traditional methods of teaching with online teaching. Moodle is an open-source platform which provides a

flexible and user friendly environment that can be accessed on any device. Students can log in to Moodle using their already existing usernames and passwords and access the game by clicking on the link that will be provided to access the ProProfs platform.
Games available at:

- http://school.demo.moodle.net/course/view.php?id=59
- http://www.proprofs.com/games/player/1932848/

6. Conclusion

There are many opportunities to implement the concept of gaming in to education and there are many kinds of games that can be used in learning process which include problem solving, drill and practice, simulation, puzzle and tutorials based games. This paper has discussed the role of games in teaching History, by applying gaming theories to enable students to view the course in a different way so as to motivate and involve students to completion. Several learning theories such as social activism theory and cognitive information processing theory were applied to understand what literature says about the impact of games in education such that the game may be successfully integrated into the curriculum. The design of five educational games and the implementation process is also highlighted to make particular undertaking for accomplishing the educational games to ensure the objectives have been met as the effectiveness of the technology tool relies on how well it solves the desired instructional goals.

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