

Adventure games in education: A review

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This paper details an investigation into the educational applicability of adventure games. Adventure games are defined and their characteristics analysed. Those making claims about the educational viability of adventure games are identified and the claims are discussed. The current status of adventure games in the classroom, and the need for further research into their educational viability and research possibilities are discussed.

What is an adventure game?

Almost every author has differing perceptions of adventure games:

Computerised adventure games create a fantasy world in the real classroom. They provide a problem solving environment. (Board of Studies, 1991, p. 206)

An adventure game is a type of package where ... [a] group of children have a problem to solve which usually involves an element of fantasy. (Dyson et al, 1988, p. 15)

Adventure Game refers to a computerized, branching series of textual segments that take the player through some kind of adventure. (LaReau and Vockell, 1989, p.22)

... the game consists of a logically connected network of locations which must be explored and travelled through. (Angle Park Computing Centre, p. 2)

Computers and adventure games together have generated a rich, creative and imaginary world; one that is difficult to provide in any other way; a world in which the players can manipulate, make decisions, discuss and simulate. (Sherwood, 1988, p. 48)

An adventure game ... is a program which simulates a small universe and puts the player inside it. The program first describes the scene; then the player types in a sentence; then the program describes what has happened in the world as a result of doing what the player asked, or why what was asked is impossible. (Culley et al, 1986, p. 69)

The world can be real or imaginary. It can be placed in the past, present, or future. The variety of worlds that can be modelled is unlimited. Users are allowed a glimpse into an otherwise unaccessible learning environment (Balajthy, 1986, p. 94)

In a computerized simulation, the computer program functions as the facilitator by presenting situations, supplying vocabulary and information, and creating unanticipated events or situations to which the users must react via the keyboard. (Dunkel, 1991, p. 3)

Adventure games are a type of simulation in which the student is invited to take part in an imaginary adventure. ... they are designed to provide a stimulus for creative activities in the classroom. (Slifer, 1986, p. 13)

From the plethora of descriptions offered, a broad definition has been adopted, which endeavours to establish some commonality between most views:

An adventure game is a software program which presents an artificial environment with which the user must interact in order to solve the problems presented in the game.

Adventure games are given a variety of names and are categorised according to a variety of criteria. 'Text adventures' and 'graphic adventures' have been classified by the appearance of the screen, while fantasy adventures have been classified by context. In software catalogues adventure games are varyingly grouped with simulations, puzzles, entertainment or educational games; if the context is fantasy, they may be placed in the Language Arts section; if they encompass aspects of geography (such as the Carmen Sandiego series), they may be placed in the Social Studies section.

Balajthy (1986, p.218) notes that adventure games can be called *interactive text games, participatory novels, simulations, interactive fiction, fantasy games, strategy games* or *mystery games*, while Guttormsen (1987, p. 37) believes that 'the term simulation can be used generically to mean any program which creates a context and poses a problem to be solved through a variety of possible courses' and goes on to include adventure games in her chapter on simulations.

Balajthy's 'A simulation is a model of a world ...' (1986, p. 94), and Polaware's description of an interactive novel 'Your computer describes

where you are, objects at that location, and possible exits. You control the outcome of the story by typing in all actions ...' (1985) are both consistent with the broad definition of an adventure game, presented above.



Figure 1: A graphic from *The Fool's Errand*, by Cliff Johnson, a graphic and text adventure which could also be called interactive fiction.

Characteristics of Adventure Games

Every adventure game has 'internal' features which collectively constitute the artificial environment. These features are designed by the author to create the environment and consist of elements such as context, plot, theme, characters and objects.

The Basic Environment

When formulating the environment, the author determines specific rules governing its operation and the functioning of objects and characters within it. The rules will often bear a resemblance to the physics of the real world for example, the user may not be able to lift or move extremely heavy objects; the laws of gravity will probably apply; certain objects will float, others will not. The user may be made aware of the rules at the beginning of the game or through the documentation, or may be expected to discover the rules during the course of play.

The Context

The context is the type of environment - an island colony, an underground cave system infested with dragons, inside a human body, a world of magic peopled by gnomes, elves and wizards, a representation of a city in 1817.

The Plot

Every adventure game has a plot which consists of what has happened (prior to the player's involvement in the game) and what needs to happen to bring the game to a satisfactory conclusion. The plot establishes the purpose or aim of the game, and may or may not be revealed at the commencement of the game. There is usually some major task to

accomplish, such as the rescue of a tree, the collection of pieces of a lost crystal or the discovery of a murderer. To achieve the major task, the player must frequently solve many secondary problems. Adventure games are generally fraught with multiple dangers, so that survival also becomes an important concern.

The Theme

An adventure game has a theme - an underlying 'moral thread' - for example, that the environment is worth saving, that good triumphs over evil, or that the status quo (of the artificial environment) should be maintained. The theme may not be as obvious as other characteristics - it may even be subliminal in nature - but it is most important for educators to be aware of the theme, to ensure the suitability of the software in an educational situation.

The Characters

During an adventure game, the user becomes personally involved in the scenario presented, either as one of the characters or as a visitor to the world. Whether entering the world as oneself or as a prescribed character, one is assumed to possess certain attributes. Attributes could include the ability to use a sword, the desire to rescue persons, animals or environments in distress, or the knowledge about how best to destroy dragons. Characterisation, indeed, a full understanding of the entire environment, can be dependent on cultural background. For example, one may be expected to know the relative value of a dime, to be able to repeat various nursery rhymes, or to be in sympathy with the entrepreneurial views of the software's author.

Other characters are usually present, who function under similar rules to the objects in the game and to the character of the player. It is often necessary to work in collaboration with other characters.

The Objects

The objects in an adventure game usually play an important role. They can generally be collected, examined and used to the advantage of the player. They are also effected by the constraints of the environment and/or the player's level of skill or understanding. A certain cultural background may be necessary to fully understand the use of objects. It may be vital to know that a werewolf can be killed by a silver bullet, but that vampires are more susceptible to a wooden cross and can be held at bay by a clove of garlic.

Adventure games have external features by which they are often distinguished or categorised. The external features comprise the game as it is seen on the computer screen, and include elements such as text, graphics, sound, animation and the type of user interface.



Figure 2: A Puzzle from *The Fool's Errand*, by Cliff Johnson, which requires an understanding of the creation of acronyms.

Text

Most adventure games feature text in one form or another. The first adventure games available were exclusively text games, in which every scene and action was described. The text entry performed by the user typically consisted of a simple verb and noun combination, for example, *go door, open book, get note, read sign, kill monster*. This was soon improved so that the user could input quite detailed sentences or phrases which could be successfully interpreted, for example, *take the lantern and the sword* or *pick up the rope and climb the ladder*.

Some more recent games allow the user to indicate actions by selecting text which is presented on the screen. The user might indicate an object or character (by selecting it with the mouse or arrow keys), and then select an action to be carried out upon the object from a menu bar (for example, *read, interview, open, examine, take*).

Graphics

Most adventure games now consist of both text and graphics. Some of these are what could be called 'graphics-enhanced text adventures' - that is, they work in exactly the same way as the more sophisticated type of text adventure, but include graphics, usually in colour. Graphics have improved from the simply-drawn 'stick figures' to far more intricate hand drawings or even scanned graphics. Although most games still present a

textual description of the immediate environment, there are some which contain graphics only, with no instructions or descriptions, the movements and commands being achieved by using the mouse or a new keys.

Sound

Sound is rapidly becoming a feature of many games. Currently, sound is used mostly for incidental sound effects and synthesised speech. Digitised sound is becoming more popular in many programs, though its use is limited by the amount of memory it requires.

Animation

Many adventure games have animated sequences in them. The movements of all the characters and even objects in some packages are displayed on the screen with almost continual animation, the effect being like a cartoon. *Indiana Jones and the Last Crusade*, by LucasFilm Games is a good example.

The User interface

The user interface consists of the 'external' or observable on-screen features which allow the user to communicate with the computer. The interface may allow graphical communication, in which the user selects graphics or meaningful icons to indicate directions, characters, objects and in some cases actions; or textual communication, in which the user enters text or selects text from the screen display.

Educational Claims and Concerns

Many people make educational claims and voice concerns about software, and most of these people have an interest even a stake in the educational software arena. Frequently the claims and concerns are unsubstantiated by any form of research and are made, not with the aim of enlightening the purchaser or assisting the educator, but rather with the aim of attracting the potential buyer.

The Stakeholders

Probably the most insistent claims are made by the software developers, their publishers and distributors. The claims of the software developers about the educational advantages of their products may be open to criticism in cases where little is known about the developer's educational expertise in the areas of teaching and learning theory, or in subject content. Unfortunately, a very small percentage of software is being developed by recognised educational bodies.

Software reviewers evaluate software and make claims or voice concerns about its educational value. It is not always possible to know if such evaluations are made objectively, or on behalf of an interested party.

Educators themselves evaluate software and present both claims and concerns for its educational viability. Their assessment is more inclined to be objective and independent than the person trying to sell the software; is more likely to be founded on a professional understanding of students' capabilities, needs and preferences; and is more probably based on an authentic classroom experience of the use of a particular software package. Nonetheless, such evaluation is not (and does not pretend to be) a rigorous study under research conditions.

The Claims

The overall claim being made is that students can learn through the medium of adventure games. More specifically, claims are made throughout the literature about what adventure games can teach and about the best methods of using adventure games. Concerns about the use of adventure games are also voiced. The six most prominent claims and three concerns are listed below.

What can adventure games teach?

1. Knowledge, skills and attitudes may be learned through the medium of adventure games.

That knowledge, skills and attitudes can be learned through the medium of adventure games is recognised by the New South Wales Department of School Education, so much so that the use of adventure games has become a suggested method of teaching and learning in many mandatory curricula, policies and syllabi.

Adventure games and simulations ... may require students to interpret information, make judgements and predictions, determine further actions and promote spatial visualisation, mapping and scale-drawing skills. (NSW Department of Education, 1989, p. 37)

2. Knowledge, skills and attitudes learned during adventure games are transferable to other situations.

The usefulness of any adventure game or simulation depends on the ability of the user to be able to apply the learning to other situations. Students need to identify, internalise and later transfer problem solving skills. Computer Education Unit (1990, p. 13)

3. Adventure games are not intrinsically educational; they can *provide opportunities* upon which both students and teachers may capitalise.

The educational aims of an adventure game set down by the developer do not often make claims about what the students will learn, but rather about

what the software is intended to provide. These are intentionally indefinite assertions, which are meant to convey that the aims are possible, given certain circumstances, for example, that the software is used as advertised, that the teacher uses any supplied resource materials and that the program is presented in an exciting and educational way. Aims, goals and objectives are targets for performance, and no package will provide the same learning experiences for every child. Teachers understand this position, and are likewise disinclined to commit themselves to more specific statements in their software reviews.

The potential of adventure games in education is recognised by the New South Wales Department of School Education, and is noted in many mandatory curricula, policies and syllabi.

Computer software such as adventure games can stimulate writers' imaginations, provide them with background material for their writing and encourage them to want to write. (NSW Department of Education, 1987, p. 9)

Mike Matson, educator and software developer (author of many adventure games, among which is *Dragon World*) states:

No child is going to sit at a computer playing *Dragon World* and come away better educated because of what he/she has seen on the screen. *Dragon World* was not designed to teach children anything. Its purpose was to provide a gateway to another world, a world in which children would be stimulated and motivated to ask questions, find answers, discuss issues, keep records and use their imaginations to make that world their own world. (Matson, 1985, p. 4)

How can adventure games be used effectively?

1. Adventure games are best integrated into a theme or unit of work.

The most popular method of use of adventure games in education is to integrate the game into regular classroom activities. The effectiveness of such an approach is recognised by the New South Wales Department of School Education and is being used in many of their new policy documents and syllabi. The 1990 draft of the *English K-6 Syllabus* has 'Using Communication Technologies' as one of its Classroom Strategies, and states that 'These strategies are designed to be used in the context of learning experiences, not as isolated activities.' (p. 90). Among the strategies is 'engaging in a simulation game e.g. *Winnie the Pooh in the Hundred Acre Wood* or *Where in the World is Carmen San Diego?*'. (p. 110). This view is adhered to by a wide range of people in the field of computer education:

Students will get more out of a simulation activity if it is part of an overall theme in which they have already done some work. (Balajthy, 1986, p. 107)

A theme or unit of work can be built up around an adventure game ...
(Fatouros, 1990, p. 24)

... incorporate an adventure game into a unit of work to stimulate the students. (NSW Board of Studies, 1991, p. 207)

Integrate the adventure game into an existing theme. Plan a unit of work around the adventure game. Integrate the facets of the story across relevant curriculum areas. (Dailhou, p. 5)

2. Adventure games should be used in a cross-curricula manner.

The inclusion of adventure games as part of the teaching and learning strategies in many and varied educational policies and curricula indicates that adventure games are generally viewed as a cross-curricular resource. Many games are cited in more than one curriculum, implying that each game is in itself a cross-curricula resource. Such claims are also made in the documentation of the adventure game packages. The Teacher's Notes for the *Riddle of the Trumpalar* adventure game (Computer Education Unit, 1990, p. 15-33) include units of work from three key learning areas.

Hopper (1989) suggests that a simple adventure game such as *Shipwreck Island* or *Dinosaur Discovery* can be used in several key learning areas, as they introduce or promote skills such as mapping, direction, time, measurement (Mathematics) drawing and painting, craft, (Creative Arts) reading, writing, language, listening, (English), information skills (Science and Technology) and subject-specific knowledge (Human Society and its Environment).

3. Additional resources can enhance the simulation, engaging the user more effectively in the synthetic world and increasing personal involvement and commitment.

Many adventure game packages contain additional resources - particularly if they are aimed at the education market. The resources might be worksheet masters, history and background information, maps, audio or video cassettes, story books and reference cards. Packages have also been known to include a range of 'simulated' items such as a criminal scrap book, travel brochures, advertising leaflets, newspaper articles, government reports, share certificates and letters to the shareholders, a gnome diary, demolition orders, posters, and even bonus items like miniature soft toys, badges, stickers, a small piece of fluff, cardboard sunglasses and coloured pencils.

Such resources, while not strictly educational, nonetheless have a significant role to play in cultivating atmosphere. They enable the user to become much more a part of the 'artificial environment'.

Concerns

Understandings will come from various sources within an adventure game, and not all of them will be intended outcomes. Whilst playing *Transylvania*, for example, one might come to understand how the parser works (the computer reply 'I don't understand' is a response to verbs not in the vocabulary, while 'You're going to have to figure outhow to do that yourself' is a response to a verb-noun construction which is not possible, such as 'Open floor'). You might form attitudes about good and evil - good people kill evil beings; 'beings' are evil (vampires and werewolves) while people are good; killing is a noble and heroic thing to do; killing is rewarded by money and sex (or marriage). You may form an understanding about men and women - men are heroes, women are kidnapped and need rescuing; positions of power are held by men (kings, vampires). You may learn that a werewolf can be killed by a silver bullet; that werewolves and vampires are more prevalent in Europe than in Australia and that the natural habitat of a werewolf is a dark and gloomy forest, while vampires live in castles (situated in dark and gloomy forests). You may become a faster typist, and you will probably learn to spell words like werewolf, vampire, princess and sarcophagus, and to know their meaning. You may be moved to make a map, and will so improve your skills of drawing, labelling and attention to detail. You will become adept at using compass directions.

Greed often constitutes an incentive in adventure games:

You, a dauntless treasure-hunter, are venturing into this dangerous land in search of wealth and adventure. (Instruction Manual for the *Zork* series, from Infocom, p. 12)

Beneath Apple Manor allows you to play the role of adventurer ... finding rich and powerful treasures. (Instruction Manual for *Beneath Apple Manor*, from the Software Factory)

and sometimes they are completely unsolvable if violence is not employed:

You and your opponents begin the game with an equal number of troops and wealth ... The object is for you to eliminate the opposing Lordlings. (Instruction manual, *Lordlings of Yore*, from Softlore Corporation, p. 2)

... your mission is to conquer and hold the 20 inhabited worlds of the Central Galactic System. (Instructions for *Galactic Empire*, from Broderbund Software)

Stereotyping is also seen as a problem

Some games create unacceptable stereotypes for males and females. Some games are aimed at male players, eg when ... the player must take on a

pre-defined male role. It is important to note that when using an adventure game, the student is dealing with a fantasy level of the game and a real level. On the real level, characters and objects behave much the way they do in real life, and the theme usually represents real-life beliefs, expressing (perhaps subliminally) the author's philosophies and opinions. Students might learn the real-life attitudes thus presented just as readily as the content - perhaps even more readily.

Each program should be evaluated and tested with groups of students to first discover what learning has occurred and then to consider the merits of that learning. Some of the skills mentioned above are undoubtedly included in many school curricula, whilst some of the attitudes possibly learned or reinforced are certainly thought to be unsuitable. There is also a matter of degree - if it is possible that a particular adventure game might present some unacceptable attitudes, but is otherwise exemplary, ought it to be used? Could the unacceptable attitudes usefully be presented as teaching points?

The use of an adventure game in the classroom cannot be legitimated without research into its viability compared to other instructional media. Critics are concerned that the use of computers for playing adventure games maybe wasting time and spreading scarce resources thinly. Perhaps the things learned through adventure games can be learned better, more quickly and more effectively through another media.

Future Research

The current thinking and concerns about adventure games have been identified throughout this paper by the claims and concerns of the stakeholders. These serve to summarise the popular feelings and experiences of those dealing with computers in education and appear to be the basis upon which teachers are using these games in their classrooms.

If these are, indeed, the foundations upon which teachers base their use of adventure games in the classroom, they must each be thoroughly researched to provide sound educational principles about their viability and pedagogic applications.

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