

The Haunted School on Horror Hill: A Case Study of Interactive Fiction in an Elementary Classroom

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ABSTRACT

As gaming technology for personal computers has advanced over the last two decades, the text-adventures that predominated in the 1980s ceased to be commercially viable. However, the easy availability of powerful authoring systems developed by enthusiasts and distributed free over the Internet has led to a renaissance in text-adventures, now called “Interactive Fiction.” The educational potential in playing these text-based games and simulations was recognised when they were first popular; the new authoring systems now allow educators to explore the educational potential of *creating* these works. The authors present here a case-study using the ADRIFT authoring system to create a work of interactive fiction in a split grade 4/5 class (9 and 10 year-olds) in Quebec. They find that the process of creating the game helped improve literary and social skills amongst the students.

INTRODUCTION

Advocates for so-called “serious games”¹, computer games that are played for purposes other than fun have made the case that computer gaming presents a novel way for students to learn (Chen and Michael, 2005). Not only do these games engage multiple learning styles (visual, auditory, kinaesthetic, and reading), but they also set the student up to participate in multiple cycles of “cognitive disequilibrium”, in which the student forms a hypothesis (i.e., “what happens if...”), tests it, and revises (i.e., “oops, I lost the game when I did that – better try something else!”) (cf. Van Eck, 2006, p. 20).

We present here a case study in which we employed a specific genre of computer gaming (“interactive fiction” or “text adventure”) in an experiment to see whether it could enhance the literacy skills of students in a grade 4/5 split class (9 – 10 year olds). Text-adventure games were prominent in the 1980s, a time when computer graphics hardware and software were rather rudimentary. In this case study, the students created a text-adventure game and played it with younger students. The creation and playing of the game had enormous positive benefits for increased literacy skill. It also had the pleasant side effect of fostering class unity and improving the social skills of the students as they worked together to create the game.

We found five major benefits to incorporating interactive fiction in this classroom:

1. It increases student engagement with the lesson.
2. It meets the needs of various learning styles or “multiple intelligences”.
3. It provides opportunities for students to become leaders in the classroom.
4. It allows all learners to contribute and experience success

5. It allows students to take ownership of their learning.

It is important to note here that we did not simply load a work of interactive fiction onto a school's computer lab computers and say, "Go play". The role of the teacher in using interactive fiction is crucial. To understand the benefits and possibilities of using interactive fiction in the classroom, we must first understand what interactive fiction, and its predecessor, the text-adventure, is.

The prehistory of computer games

Text-adventure computer games had their origins in the 1975 main-frame computer game *Colossal Cave* (Montfort, 2003, p. 85-93), also known as *Adventure*. *Colossal Cave* was a room-by-room description of a cave system near the author's home in Kentucky. In its earliest forms, a player could only move through the rooms using the cardinal directions, or by typing "up" or "down". It was not so much a game as a *simulation* of a particular environment, albeit one described in text. When *Colossal Cave* began to be widely distributed, other programmers added characters into it. The ability to pick up or use particular objects, in particular ways, was added. Perhaps the earliest non-player character to gain fame in the computer gaming world was the "Thief", who would follow the player around, occasionally pick-pocketing items from the player, just when the player needed them most.

As text adventures grew more complex and more popular, they became increasingly sophisticated. They could accept a wider vocabulary of words, and syntax that was more complicated. The computer "parser", the interface between the player and the world being simulated, also grew more sophisticated in its interactions with the player. Typing "go north and get the hammer" might be met with the response "I can't go north, and anyway, what do you want with a hammer?". Notice the "I". In the game, other non-player characters always interacted with "you": "The thief tells you, 'I only need a few more coins and I can retire!' But when the player tried to do something that the game did not allow, this omnipresent "I" would come to the fore. It was as if the parser was a kind of homunculus in the player's head, at least when the player was embodied in the world. This shifting viewpoint within the fiction, though complex, is a useful jumping-off point for discussing point-of-view and narrative structure in fiction more generally, because it confronts the student with the problem of determining "Who is doing the action?"

From Text Adventures to Interactive Fiction

With the collapse of Infocom, the main publisher of these kinds of games, text adventures steadily declined in popularity and commercial viability in the 1990s.ⁱⁱ The collapse, however, corresponded with the dawn of the World Wide Web, which allowed enthusiastic gamers to connect, swap games, types, and strategies. This nascent community also fostered a number of individuals who did not want just to *play* text adventures; they wanted to *write* them. Talented programmers opened up the world of interactive fiction to the masses by creating a kind of word-processor programme for writing text-adventures; to play or read a work of interactive fiction requires another piece of software, an interpreter (often called a z-machine, after the interpreter used and developed by Infocom).

Thus was born the Interactive Fiction Competition.ⁱⁱⁱ In a sense, the lack of a commercial interest in text adventures allowed the writers of text games to broaden their horizons, and to experiment and push the format. Indeed, the phrase "text adventure" has now largely been superseded by "interactive fiction". This new concept points to the literary aspirations of the best of the new creators – that the computer would merely provide the setting (the simulated world); the playing of the game would in fact be an act of *writing*. By performing the game, the player – the reader – creates her own narrative, her own story, which (in the best works) only happens once. The winner of the 2006 competition, *Galatea*, by Emily Short,^{iv} would not be recognizable to the players of *Colossal Cave* or *Adventure*; in *Galatea* all of the action takes place in a single room in a museum after a reception. The reader – the player – is admiring a statue of Galatea when the statue suddenly comes to life. The story emerges from the dialogue between the reader and Galatea. Depending on the kinds of questions and comments made by the player, very different trajectories may be charted. No more puzzles, thieves, or cave-trolls. *Galatea* is a very different

creation, a work of interactive literature. Interactive Fiction may be gaining academic respectability as an area worthy of literary criticism. A group blog, “Grand Text Auto”, devoted to “computer narrative, games, poetry, and art” is written by prominent “new media” academics and frequently highlights innovations (both technological and literary) in the genre.^v A recent Ph.D. thesis studied interactive fiction in terms of its literary qualities, including its use of language structures, its narrative structures, and its “filmic representations” (Douglass, 2007).^{vi}

The interactivity inherent to this genre of game and literature is especially attractive to students. Students are used to playing computer games. In many games today, the player can go almost anywhere within the simulated world; in the jargon, these are games “without rails”. Similarly, these students grew up immersed in the Internet, where anything is just a click away. Television similarly panders to shortened attention spans through its multiplicity of channels. It is not surprising then that some of our students have difficulty focusing on a book for longer than five minutes at a time. What does a book offer? It offers a simulated world, in text, on the page. However, with the exception of the “Choose your own adventure!” books (cf. Packard, 1987), there is only one start point, and one finish point, and the reader is at the mercy of the author. Books are “on rails”. Interactive fiction overcomes what, to some of our students, would appear to be the shortcomings of the traditional book.

Interactive fiction in the classroom

In its first great hay-day in the 1980s, interactive fiction was *the* computer game that everyone was playing. Early enthusiasts for the power of computer mediated game-based learning immediately latched onto the possibilities offered by the new medium. A study published in 1986 explored whether or not the “quests” offered by the text-adventures then commercially available would foster engagement with written texts, i.e., whether playing a game would turn reluctant readers into voracious ones (Lancy and Hayes, 1986). These investigators were interested in creating an anthology of games to target particular reading or grade levels. Lancy and Hayes write,

We believe that students are more likely to become fluent readers if they are exposed to “real” texts written for real purposes and that are highly motivating and interesting to children. We believe that interactive fiction could offer students who are reluctant readers a new motivation and interest to use their reading ability for personal satisfaction (p. 8).

Puzzles are a hallmark of interactive fiction. For Lancy and Hayes, it is the number, quality, and quantity of puzzles that really drive the engagement with the texts. Later researchers call this “flow” (Csikszentmihalyi, 1991), where the challenges of the game are just a little bit beyond the player’s ability, but not so far as to discourage her from playing. It is the flow that drew the students into the games in 1986, causing them to read for hours at a time (Lancy and Hayes, 1986). If the puzzles were too difficult, the player would quit the game in disgust. However, if they were able to solve the puzzle, the “buzz” at driving the story forward would keep them enthralled with the game/story (Lancy and Hayes, 1986 found it helped to have a facilitator on hand who could offer hints to get through the toughest puzzles).

From the point of view of developing literacy skills, one of the aspects of these games that caught the attention of the early researchers was the extremely structured relationship between the player and the computer parser. That is, the more complicated the game, the more complicated the sentences that a player could type in and that the computer could understand. These researchers felt this constrained the student players and forced them to clarify their thoughts and to learn to communicate effectively, although it could be a source of frustration for the players (pp. 5-6). In a later article, Lancy and Hayes suggest different models for incorporating interactive fiction into the classroom, including using various programmes for *writing* interactive fiction, as part of creative writing classes (Lancy and Hayes, 1988, p. 46).

In the 1980s, it was easy enough to persuade students to play (and read) interactive fiction, as it was the dominant gaming paradigm on the computers available in classrooms. After this first wave of

enthusiasm, and with the emergence of better and faster graphics-rendering, text-adventures became passé. However, as text-adventures became the purview of a dedicated group of enthusiasts, and the literary qualities of the best work became better known, better and easier tools for creating interactive fiction became easily and freely accessible. Today's students might be too sophisticated for playing a text-adventure; but with modern gaming comes the "modding ethos", the desire to modify and change the games. This creative urge is what we hoped to channel in our case study using interactive fiction for developing literacy skills.

Writing Interactive Fiction

In the same way a person might use a word-processor to write a novel, and some word-processors are more powerful/more user-friendly than others, there are a number of programmes available (with similar levels of ease of use) for generating interactive fiction,^{vii} for reading or playing on a number of devices. These authoring systems let the writer focus on the story and its branching structure without having to worry about operating systems, or other technical problems.

The three most common authoring systems are Inform (Nelson, 2008),^{viii} TADS (Text Adventure Development System) (Roberts, 2006),^{ix} and ADRIFT (Adventure Development and Runner Interactive Fiction Toolkit) (Wild, 2008).^x The three are distinguished by how they approach the task of modeling a world, and agency within that world (both the agency of the player, and the agency of non-player characters within the game). Inform uses a powerful interpreter to parse written text to create the game. In Inform, one could write,

The Kitchen is a room north of the Library. "The smell of rancid bacon stains everything in this kitchen, which, by the look of it, has not been cleaned in some time."

The authoring system will understand that the Kitchen and the Library are places to which the player may go. The first time the player arrives in the Kitchen, the parser will display the description. This system similarly interprets player commands, and understands what to do as the situation within the game changes. Writing an interactive fiction in Inform is very close to writing a story in a word processor. TADS, on the other hand, is much more like a computer programming language (indeed, TADS is built on the C+ language). Its input looks like this:

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Startroom: room
  Sdesc = "In the kitchen"
  Ldesc = "The smell of rancid bacon stains everything in this kitchen, which, by the look of
it, has not been cleaned in some time."
  South = Library
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Of these three systems, ADRIFT is probably the easiest one in which a beginner might generate a playable fiction. ADRIFT is a Windows-based menu- and icon-driven program. Adding a room or location to the game is achieved simply by clicking on the "add room" button, filling in the description, and clicking on the other locations to create links between them. Adding objects or other characters is similarly menu-driven.

In our case study, we explored both Inform and ADRIFT, with the intention of getting the students to do the actual programming themselves. While Inform certainly lends itself to what is more recognisable as writing, we felt that ADRIFT was more suitable for the students to use in this first experiment, given the level of literacy skills in the group.

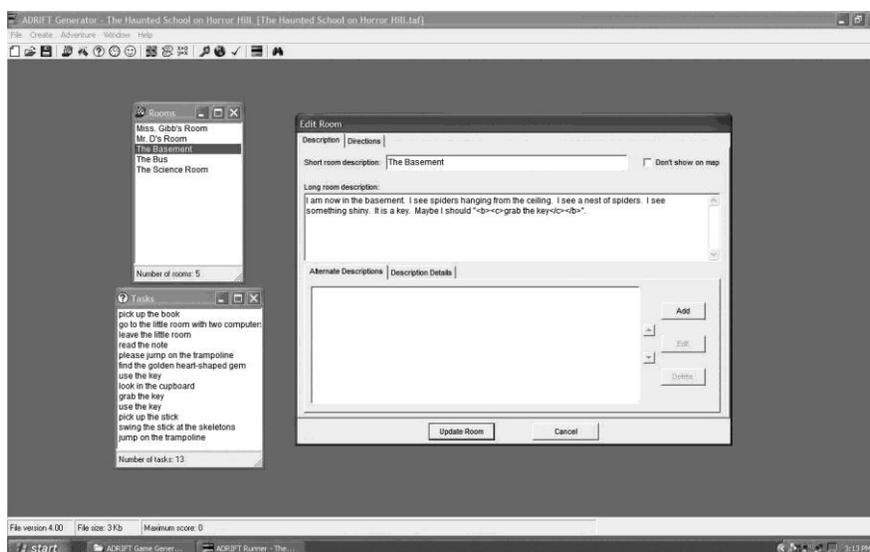


Figure 1. A game being made in ADRIFT

You are standing in the hallway. There is a classroom door before you. There is a key here.

Our case study was led in the classroom by Tamara Vaughan, a grade 4/5 teacher at St. John's Elementary School, in Campbell's Bay, Quebec, a rural community approximately 80 kilometres north-west of Ottawa, Ontario. Tamara has developed a specialization in the use of technology in the classroom and in distance learning. Before the first session, we prepared a "starter game" to model what interactive fiction was (or could be), and to get the students used to the idea. We told the students, "we're going to be making a video game" (to great cheers) "and it's going to be a text adventure" (to great moans). Upon further querying, it became apparent that the students did not know what a text adventure was (it was almost as if they had a conditioned response to the word "text" (it must be awful, whatever it is!). The classroom that we were in was equipped with a "Smart Board",^{xi} a digital white board onto which the teacher, Tamara, could project the "starter game". The setting for the starter game (or starter story) was in *in their own room*, they became excited. Their interest was heightened when the teacher selected students to go up to the board and type in commands. These students enjoyed using the Smart Board, so the selection of students was a useful management technique for the teacher. As different students tried to input commands, others in the class would offer suggestions, or corrections. In short order the whole class was deeply engrossed in the game.

The experience with the starter game illustrates the power of games-for-learning. The students would engage with the material, try different approaches, and modify their actions based on what they had learned. Being able to understand the situation presented by the game successfully and to discover an appropriate response gave the students a sense of accomplishment. Just as important, failure to type in the correct response was not viewed as a failure, but as part of the process of winnowing out options. The teacher had the students break into groups to write possible endings for the starter story. Then, using the ADRIFT game generator, the teacher and students were able to incorporate the new endings, allowing the students to play them quite soon after they were written. As a class, they voted for the endings that they liked best.

In the next session, the teacher told the class that the game that they would be making would be for a class of younger students (a split grade 2/3 class of seven- to eight-year-olds, who required simple or small words). This had the advantage of giving the grade 4/5 students, many of whom often felt marginalized, a sense of confidence and importance: they were helping the teachers "teach the smaller kids". The grade 4/5 students with lower levels of literacy (as determined by standardised testing) did not

feel embarrassed because they were working with younger children who were even weaker readers and writers. The teacher organized the class into groups of four or five students and each student was assigned a role within the group (timekeeper, task master, writer, scene setter). The only boundaries set for the story was that it had to take place within the school or its grounds, and it had to consider the reading abilities of the audience (i.e., the younger children). Each group worked on a particular room for some aspect of the adventure. They answered such questions as “What does the room look like?” “What will happen in this room?” etc. This collaborative work was done with pencil and paper, followed by students’ swapping their work with each other for editing.

In most cases, the editing process substantially improved the descriptions of each room (although one group, upon receiving the edited version of their room, proceeded to erase the changes in an effort to return their story to its original state). The students reported that they found it easier to pick up spelling and grammatical errors when working as a group. The weaker students found that they learned from the stronger students without feeling inadequate, since the task and the group made the process safe. The class as a whole took the editing process seriously, because they knew that anything they did would be visible to the children in grade 2/3.

As a class, they discussed what they thought should be allowed to happen in the story. They held a secret ballot, with the winning ideas forming the meta-structure of the story. This allowed the teacher to discuss the mechanics of fiction (plotting, characterizations, and voice) with a group that had never before been able to maintain such a discussion. In a nice touch, the winning plot was interactive itself: a student finds an unusual book on the school bus, starts to read it, and discovers himself becoming part of its story.

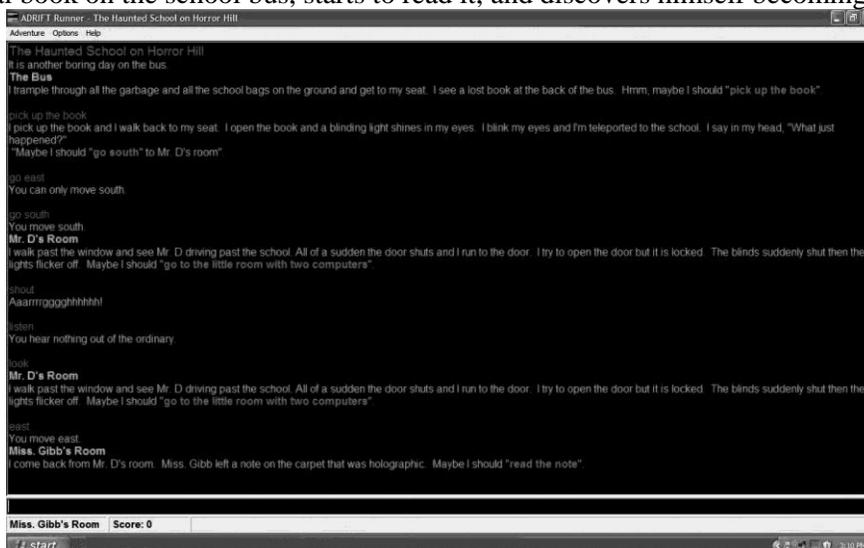


Figure 2. “The Haunted School on Horror Hill”, early play-through

The students then connected the different rooms using the ADRIFT software. The class then played the completed game so that the students could see where they needed to edit the language to make the flow of the story feel more natural. In order to present the game to the younger students, the class decided that when the story progressed to a room that a particular group had made, that group would become responsible for the presentation. This had the added benefit of improving the student’s public speaking skills. At this point, the students became concerned that their story did not have a suitable title. Again, secret balloting was used to select from competing ideas. Each student recorded his or her idea for a title on a piece of paper, and the teacher read each title aloud. Then, on another piece of paper, the students recorded three choices. The one with the majority won. The process was democratic, but more remarkable was that the class voted for the title written by a girl whose verbal contributions in class were often shouted down with “stupid!” or “nobody likes you so we don’t want to hear you”. The winning choice: *The Haunted School on Horror Hill*.

The day came to present the interactive story to the grade 2/3 class. The teacher again made the presentation using a Smart Board. Each group selected a presenter, and a person to type the younger students' responses on the computer. The presenter became a teacher responsible for explaining how the software worked and how to interact with the game's parser. The typist was responsible for typing *exactly* what the younger students requested (including spelling mistakes). The younger students were amazed at what the older students had created. They even rewarded them with a spontaneous round of applause. The older students were proud of their creation, requesting copies on CD-ROM so that they could teach their parents to play.

Benefits

In terms of literacy benefits, the game/story/interactive fiction makes a virtue out of what is often a frustrating aspect of the computer: it responds to exactly what you have typed or commanded, and not what you intended. The story cannot progress if even one letter is mistyped (although it can be programmed to respond with helpful hints when common mistakes are made). This requires that students take their time and repeatedly spell high frequency words perfectly. In addition, playing the game is fun so reading, which for many of these students is a very frustrating, unrewarding experience, became fun. Creating and playing the game placed the students in a leadership role. Students wanted to help each other within the group setting, so that they could complete the story and play the game. The stronger students helped the weaker students to spot and understand errors of grammar. When presenting and playing the game, the older students helped the younger students to understand the story and move the narrative forward. They also helped the younger students to read each section and spell words correctly.

Drawbacks

For this project, a facilitator managed the programming tasks, while the teacher managed the student side. The immediate drawback to incorporating interactive fiction into the classroom is that, despite the advent of ADRIFT or Inform, learning how to create a working game is a laborious process. On the other hand, it took us approximately four or five hours of working with the programme to create the simple "starter" game – learning how to create a PowerPoint presentation, or Word document, would take a similar amount of time. Moreover, the community of writers and creators of interactive fiction are supportive, for the most part, and willing to offer tips and to get the novice up to speed (many websites may be found at *The Brass Lantern*).^{xii} Also, many works are available with their source version (not just the playable/readable version) on the Internet at the *Interactive Fiction Archive*,^{xiii} so it is possible to see how the creator put the game together and how to mimic or alter the original work.

The most significant issue we encountered was keeping the students focused and on-task. We found that blocks of 30 to 45 minutes at a time worked best. The project took about three weeks of class time, for an hour and a half each morning. *The Haunted School on Horror Hill* required another four or five hours to stitch together the students' work. More advanced classes might want to pass the majority of this stage on to the students themselves.

The Quebec Education Program and Cross-Curricular Competencies

Our work here is applicable to almost any classroom, a hypothesis that we will test when we use interactive fiction in a grade 10 (15- to 16-year-olds) "History of Quebec and Canada" class to teach historical literacy and how to evaluate historical documents. However, we undertook this project in the context of the Quebec Education Program (QEP) (Government of Quebec, Ministry of Education).^{xiv} The QEP requires that learners meet certain goals that map across different curricula. A class project should therefore meet the goals of different subject domains. Of the official "Cross-Curricular Competencies", this interactive fiction project met the following:

Cross-curricular competency #3:
To exercise critical judgement

- To articulate and communicate his/her viewpoint
- To justify his/her position with reasons and arguments
 - (When working in a group, students were encouraged to be articulate and to be concise to help other group members understand their point of view.)
 - (Students had to convince their group members that their ideas were important through justifying why these ideas should be used in their group's room.)

Cross-curricular competency #4:

To use creativity

- To become actively involved in the process
 - (Students were excited about the project, thus this was never a difficult task to achieve.)
- To accept risks and unknowns
 - (Most students in this class did not like to take risks. Through working in groups, the responsibility was shared so students found it easier to take risks.)
- To persevere in exploring
 - (These students tended to give up when answers were not readily in front of them. The knowledge that someone else was relying on their work pushed students to persevere.)
- To be receptive to new ideas and ways of doing things
 - (Students were very open to this project because they have experience with video games.)

Cross-curricular competency #6:

To use information and communications technologies (ICT)

- To explore the potential of ICT for a given task
 - (Through creating their text adventure, students in the 4/5 class were able to explore the possible uses of ADRIFT interactive fiction software.)
 - (Students came up with endless suggestions for creating stories later.)

Cross-curricular competency #8:

To cooperate with others

- To participate actively in classroom and school activities with a cooperative attitude
- To plan and carry out a task with others
- To carry out the task according to the procedure agreed on by the team
 - (The very nature of this project demanded that students become active participants, that they work together to plan out their group's chapter, and that they stick to their assigned task.)

Cross-curricular competency #9:

To communicate appropriately

- To consider the purpose of the communication and identify the recipients
- To explore ideas related to the situation
 - (As a group, the students decided they wanted to present to the grade 2/3 class.)
 - (Students created and presented the story according to the learning abilities of the grade 2/3 class.)

CONCLUSION

The use of interactive fiction resulted in a substantial difference in the literacy and social skills of this class of students. During this project, we scraped the surface of what could be accomplished in terms of narrative complexity, branching structure, and indeed, in the representation of a game on the computer. Our experience should demonstrate the potential of using the conventions of computer games to enhance the learning of our students. In using a game technology that the commercial world now regards as

obsolete, we were able to concentrate on the substance of the learning in a novel and engaging way that resonated with our students. As one of the students said about regular computer games after the project was over, “y’know, sometimes, graphics get in the way”.

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KEY TERMS

Authoring system: a computer program used to create a work of interactive fiction.

Games off rails or open-world games: games where the player may explore any aspect of the game world, without guidance by the game designer.

Games on rails: games where the sequence of interactions is plotted out precisely by the game designer.

Interactive fiction: often used interchangeably with 'text adventure', it refers more broadly to works of computer simulation delivered via written prose that may or may not contain 'adventuring' components.

Interpreter: a computer program used to interact with a work of interactive fiction.

Parser: the game entity that describes the world of the interactive fiction to the player; most often encountered explicitly by the player when the player gives an instruction not understood by the game: "I don't know how to x,y,z!".

Text adventure: a computer simulation delivered via written prose, a kind of interactive fiction, where the "interactor controls a player character who sets out on out-of-the-ordinary undertakings involving risk or danger" (Montfort, 2003, p.6).

Notes

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- ⁱ For a succinct and current description of serious games see http://en.wikipedia.org/wiki/Serious_game.
- ⁱⁱ There are some new companies specifically targeting commercial interactive fiction at the educational market – for instance, Textfyre Inc., <http://textfyre.com>.
- ⁱⁱⁱ <http://www.ifcomp.org/> Now in its 14th edition
- ^{iv} <http://emshort.wordpress.com/my-work/>
- ^v <http://grandtextauto.org>
- ^{vi} Available online at <http://jeremydouglass.com/dissertation.html>
- ^{vii} A guide to these may be found at ‘Cloak of Darkness’ <http://www.firthworks.com/roger/cloak>
- ^{viii} <http://www.inform-fiction.org/17/Inform%207.html>.
- ^{ix} <http://www.tads.org>
- ^x <http://www.adrift.org.uk/cgi/new/adrift.cgi>
- ^{xi} Smart Technologies <http://smarttech.com/>
- ^{xii} <http://www.brasslantern.org/>
- ^{xiii} <http://www.ifarchive.org/>
- ^{xiv} A one-page summary chart of this document may be found at http://www.learnquebec.ca/export/sites/learn/en/content/reform/documents/QEP_table_Eng.pdf.