

# ***Knight Elimar's Last Joust Game Field Trial Report***

by

Herbert Wideman  
Natalia Sinitskaya Ronda  
Christine Brown

With contributions from Richard Levy and Ron Owston

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## ABSTRACT<sup>1</sup>

This report presents the findings from a field-based trial of a Web-based educational 3D roleplaying game, *Knight Elimar's Last Joust*, in three grade four classes. In the game, students assist a knight in finding pieces of his armor by solving written word puzzles with the help of orally presented clues. The game has an explicit focus on teaching students about the pieces comprising a knight's armor, but its larger goal is to facilitate literacy development through its set of language-based activities. The game was played by students working in pairs for about 100 minutes; game play was integrated into a grade four Medieval Times social studies unit. Observational data revealed a number of technical and operational issues with the usability and playability of the game, but these did not prevent most students from becoming deeply engaged in it, working persistently to solve the presented puzzles. Pre- post testing revealed a slight gain in students' of knowledge of knight armor. The report concludes with a number of recommendations for improving the playability and efficacy of the game in order to enhance its value as a literacy building resource.

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## I. Introduction

This report describes a field trial that explored the use of a 3D role-playing virtual environment game developed by one of our research partners, Prof. Richard M. Levy of the University of Calgary. The game, called *Knight Elimar's Last Joust*, was designed to enhance student acquisition of English language and literacy skills. The game's design was guided by a key principle of language instruction, namely that the actual manipulation of language should not be the central focus of the activity; instead the instruction must be constructed such that "learners use language as a means to an end" (Lee, 2000, p. 31). Also central to the game as developed is the element of learner-centeredness (Willis 1996; Skehan 1998; Willis 2003). In playing the game, the mastery of language is critical for successfully meeting the game's challenges, but learning language is not the explicit goal of the game from the player's perspective—rather it is a means to a desired end.

The game is set in a 3D virtual representation of the medieval German town of Rotenburg. It is a Web browser-framed game that uses the commercial *Virtools* browser plugin to allow Internet Explorer to deliver the gameplay. It has been specifically authored so that it can run at a reasonable frame rate on the types of computer hardware common in Canadian schools—computers which are typically several years old and do not have powerful add-in 3D video cards, but instead rely on motherboard-integrated video processing with very limited 3D video capabilities. As a result, the 3D representations in the game may appear somewhat limited by current commercial standards (see Figure 1 below), but in fact the game rendering engine is producing outstanding results given the limitations of the technology upon which it is designed to run.

Figure 1: Game screenshot



The game play of *Elimar's Last Joust* is structured as a role-playing quest or treasure hunt embedded in a medieval narrative. (Medieval Times is a unit of study in the Ontario social studies curriculum for grade 4. See

<http://www.edu.gov.on.ca/eng/curriculum/elementary/sstudies18curr.pdf> for details.)

Students assume the role of a virtual character or “avatar”, taking a first-person perspective and moving the character around the medieval town environment via the keyboard. The player character is asked to solve a mystery about a knight’s armor that has gone missing (and which he must retrieve to defeat an evil knight who is threatening the community). Students must determine a series of “clue” words which help to unlock the next level or area of the game by finding special objects in the town that make short oral audio “presentations” and then ask a question whose answer lies in what was just discussed, and from which students deduce the clue. These “level clues” are then used as solution elements in a paper-based crossword puzzle or word search puzzle created by the game developer for that game level. When the full set of word clues for the level are found (there are several for each level), the student is able to determine from the puzzle the password required to recover one part of the knight’s missing armor in the game, and to proceed through a gate to the next section of the town. The password for the next level is actually the name of the armor piece retrieved on the current level such as “gauntlet” or “cuirass”. Practice puzzles of both types with completed “clues” were given to the

students prior to game play, and these demonstrate the nature of the problem solving required to find the level passwords (see Appendix 1).

This pilot study was designed to examine the feasibility of the use of the Knight Elimar game in typical classroom contexts when integrated into the Medieval Times unit that is part of the required Grade 4 curriculum in the province of Ontario. It examined issues of implementation and usage, as well as student outcomes in terms of specific subject knowledge gained, student attitudes and perspectives on the game, and student persistence and focus during game play.

## II. Design and Methodology

One full class of grade four students from one school (class C) as well two half classes of grade four students from two split grade 3/4 classes in a second school (classes A and B) participated in the trial. Both schools were located in suburban areas of southern Ontario. The teachers of each class had volunteered to participate, and their students had all returned signed informed consent forms for study participation that had been sent home to their parents or guardians. Each teacher was visited on at least one occasion a few weeks prior to student use of the game, and provided with an installation of and walkthrough of the game on his or her computer as well as several resources for student use prior to and during the gaming activities. These included: (1) practice sheets for each type of game word puzzle—crossword and word completion (see Appendix 1); (2) A PowerPoint presentation outlining the narrative story in which the game was embedded and the procedures and stages involved in playing the game; (3) game installation and play instructions for the teacher; (4) an illustrated story booklet for students to read containing the narrative context for the game's questing activity; (4) a student workbook consisting of the word puzzles they needed to solve using the clues they collect on each level; (5) identical pre and post game session tests consisting of a diagram of a knight with arrows to various elements of his armor, asking for the names of these elements; (6) a pre-game background student survey form; and (7) a post-game survey form. The game was either installed by a research team member on the computers students would be using for the trial (in either the classroom or school library), or by the school board's IT department on the relevant computers which were deemed appropriate to run the game.

Game play by students was scheduled by their teacher into the concluding periods of the mandated unit on Medieval Times. Student play was preceded by an introduction to the game, which was led by the teacher, who made use of the PowerPoint presentation, story booklet, and practice puzzle sheet. Just prior to game play, students completed the pretest, as well as a pre-play background survey which gathered data about their computer and gaming experience.

Students were then paired up to play the game, with teachers putting students into their pairs using classroom management criteria—pairing potentially challenged or disruptive students with those who tended to be more successful or focused. Two of the three grade four classes (classes B and C) played the game in the school's resource centre, the only location where enough computers could be accessed. The full class of grade four students (class C) was split in half for game play due to a lack of computer availability, with half playing the first day and the other half the following day. Student pairs were given approximately 90-100 minutes for game play. Immediately following the play period, students completed the post-test and a post-play survey which tapped student

perspectives and opinions about playing the game and its educational value. Student game workbooks were collected and the number of clues on each level that the students correctly solved were tallied and averaged across each class.

Observational data on student interaction, engagement, and technical problems were gathered during the course of testing. In addition, five students from each of the three classes participated in a focus group following game play, which probed more deeply into their experiences with and perspectives on the game. Data from the observations, surveys, and focus groups were collated and analyzed with attention being paid to any potential inter-class differences in play processes or outcomes.

### III. Results

#### **Student background Information**

There were roughly equal numbers of male and female students within the three participating classes, and most students were of Caucasian origin. The majority of the grade four students indicated in their pre-game survey that they used computers every day, with answers ranging from a high of 3.5 hours per day, to a low of 30 minutes per week. Most students reported using computers for word processing, email and/or Internet and web searches, with about 25% indicating that they used computers for other activities, such as creating spreadsheets, playing video games, and interacting using MSN and Facebook. All of the students had used computer games in their classrooms, for subjects such as math, French, and science. No systematic differences emerged across the three classes on these factors.

When asked what aspect of the Middle Ages the students were interested in, most (about 90%) indicated that “stories and legends” and “knights and castles” were of interest (as selected from the available options), with a lesser number of students choosing “history” and “movies” as areas of interest. Reported interests were similar for all three of the classes involved in this test.

#### **Observational data**

A clear distinction emerged between the gameplay experiences and behavior of those in class B, who used laptops in the school library for game play, and the other two classes. Students in this one class encountered significant difficulties accessing, loading, and playing the game. Many of the computers were unable to load the game within 10 minutes, causing the students to return the computers to the mobile cart and then re-start the game on a new computer. Some of the students were completely unable to access the game, and they “played” largely by looking on as the game was played by others. Once the game had been loaded, several students in this class experienced a “freeze” of the game, which, if the computer was left for 5 minutes or longer, eventually resolved itself, and game play continued. These difficulties generated high levels of student frustration and severely limited their engagement in the game. (The reasons for these operational problems are taken up later in this report.) Of all of the student pairs in this class, only one was able to successfully navigate the game to completion.

In the other two classes, the game was much more successfully engaged by nearly all of the students. Student motivation and persistence in play was consistently extremely high; very little off-task behavior was observed during the gaming sessions. When technical

challenges arose, students tried to resolve them and if stymied quickly sought help from the teacher or the observing researcher. While some students had questions about how to proceed to collect the clues they needed to solve the word puzzles, and a few were unclear about how the clues were to be used in the puzzles to come up with a puzzle solution (the solutions were the passwords that had to be typed in to open the gate to the next area of the town), the large majority of the pairs in both classes were successful in determining the needed clues and solving the level passwords and so were able to proceed through the levels or areas of the town. In many cases, student pairs did not bother locating and resolving all the clues for a given level's word puzzle, as the password solution could be (and was) inferred from the word puzzle without knowing all the clues. Several instances of "cheating" were also observed, where students obtained clues from other pairs who had determined them. This was seen more commonly in class C, where pairs of students were using desktop computers placed fairly closely together, and so the different student pairs were generally close to each other, working side by side along long tables backed against the library wall. In class A, laptops from a cart were used, and the student pairs were widely dispersed in the classroom as (unlike the students in School B) they were not provided with headphones to listen to the game audio and so had to be far apart to avoid audio interference between pairs during game play. This greater inter-pair distance appeared to reduce the amount of "cheating".

### **Technical and game design issues**

A number of technical and game design/operation issues emerged during this trial. The most debilitating issues arose with class B (the class that used the library laptop set); they were largely due to the fact that the specifications of the computers used did not meet the minimum hardware specification requirements for smooth game play. When the game was first installed on these laptops, it was confirmed by a research team member that the game would run, but she assumed the laptops were identical to those she had successfully installed and tested the game on in the class set used by class A, and so did no play testing. However it was determined later that the library's set of laptops was several years older and had half as much RAM memory—only 256 Mbytes, which crippled game loading and performance (later testing revealed an average game frame rate of about 7 frames per second on these computers, far too slow for smooth game play). No such problem existed with class A's laptop set which tested out at a fully functional 30 frames per second and did not have game loading issues; nor were there any performance insufficiencies in the desktop machines used in School B (although two older machines that were present in the library were too slow to be used).

The most common and persistent gameplay issue observed in the two functional classes and encountered by many pairs of students, arose when students were somehow able to walk their avatar character through walls and out of the legitimate boundaries of the game's town level maps. These outside areas were often large and were empty of clue-

providing objects. Getting their character back into “legitimate” areas of the game’s environmental map was next to impossible for students; they required the help of an adult, and even then success was not always possible and the game had to be rebooted. As the game had no game save option for saving game progress by a player, the game had to be started from the beginning again. A student pair on level four at the time of the restart would then have to re-traverse the first three levels, re-entering the passwords for each of three level gates, to get back to their previous position. This process would usually take several minutes. That students were willing to do this—in a few instances more than once—demonstrated their high level of engagement with the game.

The second major technical issue encountered in the two functional classes was the occasional game “freeze” in which character movement suddenly was not possible. Most commonly this occurred due to a game design decision: when an oral clue was being presented by an object, the player is deliberately locked into position so that they do not wander away and so fail to hear the full clue dialog. However after having heard the clue dialog through once, if a player did not move their avatar quickly away from the object, the dialog would soon begin to repeat and the player would be locked in position for a second dialog cycle, which proved frustrating and wasted play time. Less common was a second type of lockup, where a character not near a clue object would suddenly freeze up due to a game bug that required a restart of the game.

A few other game design elements were observed to interfere with smooth game play on occasion:

- The game allows a set amount of time for students to figure out the password for a given level, after which it presents the password on the screen. Several students commented that they did not want to see the password when they were not yet done solving the word puzzle – they wanted the time to figure it out on their own.
- The objects presenting the clues change color when an avatar gets close enough to them for them to start up their clue dialog, but they revert to their original colour when the avatar is removed from their area after hearing the clue. Consequently students wandering around town areas would receive no visual indicator that they had already heard a given clue dialog associated with a particular object, and so would sometimes wind up getting locked into hearing a clue for a second time.
- Students had a tendency to try to orient their character’s viewpoint using the mouse (not surprisingly, as this is the most common orientation technique employed in first person commercial PC games). They sometimes had difficulty realizing they needed to use the F6 and F7 keys to rotate their character’s viewpoints, but had little difficulty using the arrow keys to move forwards, backwards, and sideways (again, these arrow key assignments are commonly employed in commercial PC games).

- If students took too long to advance their avatar through an open gate between town areas/levels after typing in the right level password to open it, the gate would “time out” and close, leaving them locked in a level they had completed, and the gate could not be reopened.
- One pair of students were stuck on the clue for the word “glove” as it was defined as “coming ½ way up the arm” – not common for gloves in contemporary Canada.

### **Student game task completion rates**

As students worked through the game, they were asked to record their answers to the oral questions presented in the game into the word puzzle forms for each level contained in a printed game work booklet – either as entries into the crossword for the level, or as selected words marked off in the word search puzzle matrix of letters. There were 31 answers or clues required by the game in total over all five levels of the game; the number of correct answers found in student workbooks ranged from 0 to 29. The average number of correct answers across the two classes who were able to successfully use the game was 16.9 (see Table 1). (Data from class B are not included in the table because only one student pair was able to successfully navigate through the game in that class.) Based on our observations of game completion in class, it appears reasonable to infer that School B students did not perform as well at answering the level 5 questions because they generally took longer to work through the levels and consequently several teams did not have adequate class time to complete that last level. The relatively low number of clues (less than two thirds) completed on a few levels corroborates our observations that students were sometimes able to determine a level password by only partly completing the word puzzle task for the level.

Table 1: Average number of clues recorded

<b>Game Level</b>	<b>Class A</b>	<b>Class C</b>
Level 1	2.82	3.35
Level 2	4.73	4.30
Level 3	4.73	4.15
Level 4	2.45	2.35
Level 5	3.45	1.45

### Student armor terminology acquisition

Both before and immediately after game play, students were given a picture of a knight's suit of armor, and asked to label the different pieces which make up the knight's battle gear. There were 7 pieces to be identified. In the pre-game test, the average number of correct answers was 1.9, as most of the students correctly identified the helmet and sword pictured. In the post-game test, the average number of correct answers was 3.2, indicating that students had acquired some new (albeit limited) knowledge of the correct names for the different pieces in a suit of armor. Not surprisingly, the two classes that were able to successfully complete most or all of the of the game showed greater gains in their test scores (see Table 2 for class breakdowns). Students were more likely to have acquired the terms "gauntlet", "sabaton", and/or "coat of arms" than others such as "cuirass". Overall, it appears game play was not very successful in helping students learn the terms for armor pieces.

Table 2: Pre and Post-Game Test Scores

Test Score	Class A	Class B	Class C
Pre-Test	1.92	1.85	2.00
Post-Test	3.73	2.75	3.26

### Student perspectives on Elimar's Last Joust: Survey results

In the post-game survey, when asked an open-ended question about the goal of the game, most students responded that the goal was to find the armor for Elimar. Students made statements such as "the goal of playing the game is that you are supposed to help Knight Elimar receive his armor all over town," and "the goal of playing this game is to answer all of the clues and get all of Knight Elimar's armor". One student identified the goal of the game as "having fun".

Asked what they had learned from playing the game, students offered a range of responses. Typical examples: "I learned about what sort of armor they wear when they fight", and "you can tell who is in the armor by looking at their crest". Students from all three classes identified similar game goals and game learning outcomes.

Most students used the work booklet, filling in the puzzle templates as they played; however about 10% said they did not, citing reasons such as "it would be harder to do it" and "I just remembered". One student indicated that they often guessed the answers and passwords, and so they did not need to use the booklet to record their answers.

When asked how often they would like to use *Knight Elimar's Last Joust*, about 75% of the students in class A, as well as 75% of those students in class C, said that they felt

once a week would be optimal; other answers provided ranged widely from “More than once a week” to “Once or twice a term”. Students were generally eager to play games similar to *Elimar’s Last Joust* in school, and thought they could aid learning in other subject areas

Students in class B were not as enthusiastic about the game due to of their negative experiences arising from the technical difficulties they encountered. These students felt that the game should be played less often, or not at all. These students were frustrated with the gaming session, and made largely negative comments about their experiences on the post-game survey (as well as verbally in their focus group – see below).

### **Student perspectives on Elimar’s Last Joust: Focus group results**

#### *Class A*

Students in this class identified several problematic areas in the game, which can be divided into two broad categories, the first being control of the player within the game environment. Issues in this category included frequently reported difficulties accomplishing what they wanted to do within the game in terms of controlling the knight character’s movements. The second category of concern centred around limitations and bugs in the game’s functions of the type noted in our gameplay observations above, such as the permeable “walkthrough” town walls that allowed players to leave the legitimate game space; an intrusive level completion timing function that sometimes presents the level password before students determine it for themselves; and clues that get repeated by objects and lock players in place so they cannot be bypassed. Some students also criticized the game for lacking any jousting or sword fight opportunities. Students in this class suggested that the game could be improved by having a virtual notebook on the computer where the clues could be recorded, rather than having to record them on paper.

Asked to identify any positive aspects of the game, students commented on the appeal of the video game itself, on several attractive functionalities, and on the authenticity of the game and the learning experience. In terms of game functionalities, students mentioned that they enjoyed being able to hear dialog from the game objects, playing from a 1st person perspective, the narrative component of the game, and the music. Most students commented on the different authentic elements of the game (e.g. the armor, forms of transport, materials) and how these supported their learning about medieval times. Students were generally positive about the idea of using videogames in the classroom, listing among the benefits of gaming the ability to learn by doing, combining fun and learning, improving computer skills, and increasing retention through the use of the computer. Students’ responses varied in their opinion of how often video games should be used in the classroom, with most students leaning towards high frequency (every day for the whole day, every day for three periods). Asked how the gaming experience affected their level of interest in medieval times, one student reported maintaining her

high level of excitement, while others another reported higher levels of interest as a result of playing the game.

### *Class B*

As mentioned earlier, students in this class almost universally experienced technical problems with game play and were largely unsuccessful in using the game; as expected, these students raised several issues that they experienced during game play related to improper game functioning: having to enter level passwords several times before they worked; the game running too slowly; and the game locking up. They also critiqued player control (citing an inability to readily control the knight, and having to use the keys to move the knight as opposed to the mouse), other problems with hardware (trouble hearing the music and voices through the tiny laptop speakers), and general properties of the videogame (lack of 3D characters, no battle opportunities, no monetary rewards).

Several of the suggestions students made for game improvements were common to two or more students, including fixing the game lockups, improving game functionality by allowing the use of the mouse to manipulate the character; integrating the work booklet within the game environment so that students can write down their clues on screen; lifting the level time restrictions; adding a help button; and introducing more interactive elements into the game, such as talking to other characters to get clues rather than hearing the objects talk, and battling other characters. Other suggestions were made by individual students: making the game environment darker to make it look more authentic, and enabling interaction with other objects around the playing character.

Asked about the characteristics of the game that appealed to them the most, students mentioned the game interface (being able to see how the knight's armor is getting completed), the game being goal-oriented (receiving a promotion to squire upon successful game completion), the authenticity of the game environment (e.g. being able to see what people used to wear at the time), and multimedia elements such as the use of music and sounds. Students in this class cited various benefits to using video games in the classroom: video games help studying, they make learning fun, provide an authentic environment for learning, and can be used across different subject areas. Despite the technical issues they encountered these students generally felt that playing this video game made them more interested in medieval times.

### *Class C*

These students identified many of the same deficiencies in the game as did those in Class A: the premature provision of level passwords, problems caused by walking through walls and being unable to get back in the game area, and problems with clues (clues repeat automatically, "fake" clues, lack of a cue for determining if a clue has already been heard), and external factors such as a lack of computers for game play. The content

of the game was another area of concern: a few players thought some clues were too hard to figure out, and one mentioned that the “replay appeal” of the game was limited.

Two or more students proposed a number of specific improvements to the game: making changes to the clues by taking away the “fake” clues, and having difficult clue words spelled more slowly; making the game more interactive by introducing talking characters, and having a joust at the end; expanding the game by adding more levels of the game to keep it challenging; and adapting the game to other subject areas. Other suggestions were made by individual students: having a help button which would give clues, making the game environment darker to make it look more authentic, and enabling interaction with other objects around the playing character. Students in this class generally had a positive attitude towards the game, citing the game’s authenticity (being able to see the knight’s armor, and medieval times environment), and the game’s “fun factor.” They did have recommendations for improvements: the addition of more game levels (25% of students), removal of fake clues (1 student), spelling out difficult clues more slowly (1 student), and an eliminating the timed level password provision (1 student).

Class C students wanted to play games in the classroom very frequently; their preferences ranged from once or twice a week to every day. The idea of using video games in the classroom was very positively received by these students, and they identified a number of benefits of gaming for learning. Students saw games as a way of combining learning with “fun” (said one student, “I like the idea because then you’re still learning, but you’re having lots of fun”), and wanted to extend game-based learning to other subject areas. The only negative consequence foreseen for using more video games in schools was a potential for adverse effects on health (e.g. eyes getting tired). Asked to comment on how the game affected their level of interest in the medieval times, students indicated it either remained at a high level, or increased from moderate to high levels.

#### *Cross-class comparison*

Students in the three focus groups identified 19 unique problematic aspects of their game play experience, with six of those problems being reported by more than one class: lack of mouse control of the knight character, the timed provision of passwords, the wall-walkthrough bug, the lack of interactive jousting or battle, verbal clue repetition, and game freezes or slowdowns.

Taken together, focus group participants contributed a total of 14 unique ideas on how they would like to see the game improved. Only three of the proposed 14 changes came up in more than one class: adding a notebook on the computer where clues could be recorded; talking to other game characters rather than objects to get clues; and adding interactive battles, for example including a joust at the end of the game, or battling unfriendly characters and monsters or dragons.

The positive things that the students had to say about the game were fairly consistent across classes. Four responses were the most common, and were found in every class. Students thought that the game had authentic medieval details that helped them learn about the Middle Ages (50% of students in class A, 25% of students in class B and C). They also enjoyed the knight and various authentic details of his armor (25% of students in class A, 50% of students in class B, and approximately 1/3 in class C). Music was another feature that was appreciated by most students in class A, and 25% of students in class B. The majority of students also mentioned that the game was fun to play.

In evaluating how frequently the students would like to play games in class, most answers were on the high frequency end of the spectrum. Seventy five per cent of students in class A and 25% of students in class C would like to play games every day, and 25% students in class C answered with a less specific 'a lot'. Fifty per cent of students in class B would like to see games used 2 or 3 times a week.

Across the board, students had an overwhelmingly positive attitude towards learning with video games. They would like to see more games used in class, especially in other subjects. The most common reason given: it makes learning fun. Two students thought that video games give them opportunities for hands-on learning ("you're actually doing lots of stuff", as one student put it).

Most students in the three classes indicated that their interest in the medieval times was affected by their gaming experience. Students reported either a higher level of interest as a result of playing the game, or the maintenance of an already high level of interest in this subject.

## IV. Discussion and Recommendations

Excepting the students in class B who encountered crippling technical issues, the trial participants clearly found playing *Elimar's Last Joust* an enjoyable and intrinsically rewarding experience. They were virtually unanimous in holding that it contributed to building or maintaining their interest in the unit subject (medieval life), and generally considered it an aid to learning. The objective evidence for any new learning was more ambiguous; while all three classes showed an improvement in their knowledge of the elements of knight armor, the improvements were relatively minor. It is somewhat encouraging to see that at the inter-class level the extent of the measured learning correlated positively with the degree to which students worked through the game, as indicated by the number of word puzzle clues solved; but the small student sample size participating in the trial precludes making any definitive statements about the game's impact on student learning. Still, the game demonstrated clear strengths as a motivational adjunct to the Medieval Times unit; both the observational data and student self-reports indicate that the game held and maintained student interest despite the technical issues that arose for many student pairs during game play. Students persisted in playing the game through the full 90-100 minutes of class time allotted to it during the trial. The game effectively engaged students in a rich and diverse set of literacy-oriented activities, from listening to and developing inferences from extensive dialog when garnering clues, to reading, writing, and problem solving as they attempted to solve the game's word puzzles

As both the observational data and student reports indicate, there were a number of technical and operational issues with the game in its current state of development that significantly impede student play, lead to player frustration, and in all likelihood negatively effect the learning outcomes of game play. The recommendations that follow both address these issues and suggest other ways in which the playability and educational value of the game might be enhanced.

1. Provide explicit and detailed minimum equipment requirements for successful game deployment so teachers and IT support personnel can accurately judge whether game play on available school equipment will be feasible.
2. Make the town's walls impenetrable so that players cannot move their avatars outside of legitimate town areas. Students could not get their avatars back into the right areas after wandering through walls and would often have to restart the game.

3. Resolve remaining issues with game lockups which forced restarts and increased student frustration.
4. If possible, provide game save states. This would allow players to engage in more complex and lengthy games over several play sessions, increasing the probability of meaningful learning as, with practice, the cognitive load imposed on students in learning how to play a novel game type is eliminated.
5. Have the verbal clue providing objects/characters permanently change color once a clue has been fully provided, so that students know they have already received the clue from that source and do not waste time repeating it.
6. Provide more time for character avatars to get through opened gates between levels before re-closing them.
7. Remove the avatar movement lockdown that occurs when an avatar is listening to a clue provided the player is hearing the clue for a second or third time, so that if the oral presentation of the clue is mistakenly re-activated during game play a player can move the avatar away from the area.
8. If possible, allow mouse-based directional orientation of the avatar character in the game as this is less awkward than using the F6/F7 keys, and is the interface approach common to virtually all commercial 3D first-person games; students expect the game to work in this manner.
9. Remove or make teacher-adjustable the time-delayed presentation of level passwords. While designed to reduce the frustration of those who cannot solve the level's word puzzle after a set time, it was observed to trigger prematurely, irritating students, and removing opportunities for students to effectively engage the puzzle challenges.
10. Enhance the immersion of the game play by providing animated human characters as clue providers rather than inanimate objects. Students complained that the use of inanimate talking objects spoiled the realism of the experience.
11. Provide a teacher-controlled option for non-injurious tournament jousting as a reward for completing the armor quest. This was desired by a large number of students, but teachers must be given the ability to deselect this option in compliance with personal values and/or school and board policies related to violence in games.
12. Target the game to grade five rather than grade four students, or lower the language level and difficulty of the word puzzles. Observational data and test results both strongly suggest that average and below average students at the grade four level had considerable difficulty with the puzzle challenges and the vocabulary being used, leading to occasional frustration and some "borrowing" of answers from peers. The

overall vocabulary level and puzzle difficulty as it now stands would seem more appropriate for grade five students.

## References

- Lee, James. (2000). *Tasks and communicating in language classrooms*. Boston: McGraw-Hill, Inc.
- Skehan, Peter. (1998) Task-based instruction. *Annual Review of Applied Linguistics*, 18, 268–286.
- Willis, Jane. (1996). *A framework for task-based learning*. Harlow, England: Longman.
- Willis, Jane. (2003). *Task based learning and teaching*. Oxford, England: Oxford University Press.



**B: “Word Search Puzzle”**

Listen to all the clues and find the **six** answers in the word search puzzle.

e	p	r	i	n	c	e	s	s	p	e
t	a	g	n	i	k	s	s	w	o	d
a	r	d	j	o	u	s	t	c	a	i
g	s	s	p	e	a	r	t	l	e	r

Once you have answered all questions on level 3, write down the left-over letters below (keep the same order as above).

1. \_ \_ \_ \_ \_

2. \_ \_ \_ \_ \_

Remember, only type in the **second** word to open the gate to level 4!