What can avatars do? Virtual realities in collaborative language learning
O que avatares podem fazer? Realidades virtuais colaborativas para aprendizagem em cursos de línguas estrangeiras

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Resumo: Este artigo demonstra como 3D Second Life (SL) é usado para melhorar a aprendizagem colaborativa na universidade. O estudo de caso é incorporado em um sujeito, para inglês técnico e com base na *web* escrita, em que 74 alunos simularam o seu curso em um salão de exposições virtuais em Hong Kong PolyU Second Life Campus. Os alunos trabalharam como avatares em um sistema de votação, avaliaram o trabalho dos outros e fizeram comentários sobre blocos que foram compartilhados pelos avatares em ação. Para saber se esta prática é mais eficaz do que uma discussão de duas dimensões na WebCT, o *feedback* dos alunos sobre SL foi coletado através de uma pesquisa *on-line* (*i-Feedback*) e discussão em grupo focal. Os resultados sugerem que uma única tarefa em um ambiente virtual de aprendizagem pode estimular o interesse dos alunos, apesar de a complexidade técnica poder frustrá-los. As possibilidades, as limitações e os desafios técnicos do SL na aprendizagem de línguas têm sido discutidos com provas a partir de dados coletados automaticamente ou manualmente.

Palavras-chave: *campus* virtual, aprendizagem colaborativa, avaliação por pares.

Abstract: This paper demonstrates how 3D Second Life (SL) is used to enhance collaborative learning at university. The case study is embedded in one subject, English for Technical and Web-based Writing, in which 74 students displayed their coursework in a virtual exhibition hall on Hong Kong PolyU Second Life Campus. The students worked as avatars in a voting system, evaluated each other's work and made comments on notecards which were shared by the avatars in action. To find out if this practice is more effective than a two-dimensional discussion on WebCT, the students' feedback on using SL was collected through an online survey (i-Feedback) and focus group discussion. The findings suggest that a single task in a virtual learning environment can stimulate the interest of students, even though the technical complexity may frustrate them. The possibilities, shortcomings and technical challenges of SL in language learning have been discussed with evidence from automatically and manually collected data.

Keywords: virtual campus, collaborative learning, peer assessment.

INTRODUCTION

This paper discusses a case study of outcome-based learning experience of a cohort of students who studied 'English for Technical and Web-based Writing' in a university in Hong Kong. The intended learning outcomes of the subject include creativity in writing and design, problem solving and teamwork skills; and confidence and competence in human computer interaction. In addition to graphic design software for bringing text and image together, 3D Second Life (SL) was integrated into the course for enriching students' computer literacy and collaborative learning.

Communal Constructivism and Knowledge Building theories suggest the idea of constructing knowledge for both current and future users (Girvan and Savage, 2010). In our study, student work can act as artifacts housed in a permanent

location which future classes use as context points to add on to their own knowledge. The case study was built on one of the coursework, movie poster design, and the student learning experience in the virtual campus environment where peer critique was conducted in the light of understanding and application of basic principles of design as well as linguistic efficiency. Data from focus group interviews and online survey (i-Feedback) were gathered to examine students' response to using SL in their learning. The paper takes a close look at students learning experience, including perceptions of (1) language proficiency of online publishing, (2) application of design principles and technical writing through the peer critique process, (3) the technical challenge for students to function in the SL environment and (4) development of a collaborative learning community through SL.

The aim of this study is to answer the following questions:

1. What are students' perception of working on a virtual campus for technical and web based writing?
2. What are students' attitudes and achievements of using SL as a collaborative learning community?
3. How can SL learning experience help with future university studies and career goals?
4. How does the peer critique affect their learning of the taught component?

The paper first introduces the background of virtual campus and its potentials for project-based experiential learning of interdisciplinary communication (Jarmon *et al,* 2009). Methods of the research will be described and results presented to indicate how students are motivated in the SL environment and how acquisition and application of learning outcomes can be realized. Technical challenges are also discussed to reflect how they may hamper students' enthusiasm in adopting SL for learning. The study is unique in that it looks at Second Life in the context of a Hong Kong university and the applicability of an English (Humanities) technical writing course for ESL learners in a "blended" (Herold, 2010) virtual learning environment.

BACKGROUND OF VIRTUAL CAMPUS

Second Life (SL) is a popular 3D virtual world with over 18 million users worldwide. Although not quite at the level of widgets, such as Facebook or Blogger, Second Life has rich 3D virtual environment with great potential in simulating real life, overshading 2D texts and pictures. One of the major contributions of SL lies in education. It can support learning activities by creating innovative environments for distance education. Students can, in the virtual world, enjoy simulations of lectures, enhance experiential learning, practice skills, try new ideas, and learn from their mistakes.

A Virtual PolyU Campus has been on the Second Life platform since 2007. The Hong Kong Polytechnic University is the first educational institute in Asia to set up a virtual campus in Second Life for teaching and learning activities. The initial project "PolyU Virtual Hotel" gradually developed into a virtual campus where the university Pao Yue-kong Library, Department of Applied Social Sciences, Department of Computing, School of Hotel and Tourism Management and School of Design have their territories. The virtual campus provides a 3D virtual environment supporting student learning activities with four functions: Teaching & Learning, Assessment, Design and Resources (Herold *et al,* 2008). The project has benefited over 1,000 students.

The motivation for us to step on the virtual campus is the interactive assessment of student coursework. Given the student-centred nature of outcome-based education, learners are heavily involved in the assessment as a part of their learning process. Haas, Tulley, and Blair (2002), while acknowledging that traditionally technological literacy has been male-oriented (and thereby a product to be mastered, as opposed to being a process to be nurtured), also call for the sharing of web-based projects through a "studio review" – juxtaposing between exchanging of hardcopies of papers in a traditional classroom peer review, versus virtual commentary and sharing of works-in-progress in the multimodal virtual classroom. In the past, students' multimodal compositions, such as posters and user guides, were uploaded to the WebCT and students had to download or open the files one by one before assessing them.

The comments were either written on a paper form, or keyed in an online discussion area while jumping between the windows. The SL, as the third generation of e-learning, provides highly interactive function with online visualization, which can stimulate student interest and speed up the evaluation process.

The emergence of virtual campus has enabled various applications that further promote interactions between people online. Virtual worlds can be useful in helping students achieve pre-set educational goals and objectives, if the activities in the virtual world are sufficiently contextualized and integrated into the offline course (HEROLD, 2010). Digital enhancements offer unlimited opportunities for infusing subject matter directly into the classroom (FOX *et al,* 2009). Second Life, as such an application can be a useful tool for teaching students about poster design and technical writing. Within social media, virtual worlds are different from other applications in three ways: I) virtual worlds allow udders to interact in real time (whereas there are time delays in such tools as Facebook); II) virtual worlds allow users to create fully customized self-representations (avatars) (far more flexible that image creations in online communities like YouTube); and III) the basic rules of physics makes SL three dimensional and navigationally comparable (KAPLAN and HAENLEIN, 2009).

COLLABORATIVE LEARNING

"Collaborative learning" represents a significant shift away from the typical teacher-centred or lecture-centred milieu in college classrooms. Derived from the Harvard model of "teaching for understanding" learning is a performance, whereby the learner applies learning in new contexts, thus increasing competence (CRAFT *et al,* 2007). Teachers become designers of intellectual experiences for students-as coaches of a more emergent learning process (Smith and MacGregor, What is collaborative learning). In this case study, collaborative learning co-exists with other learning processes (lecturing, listening, note taking etc) and is prompted by text-based peer-peer collaborative dialogue in a computer-mediated learning environment in the EFL context (ZENG and TAKATSUKA, 2009). The design is time and place independent, enables quick feedback and real time interaction. It also brings speech and writing together "with the interactional and reflective aspects of language merged in a single medium" (WARSCHAUER, 1997, in ZENG and TAKATSUKA, 2009).

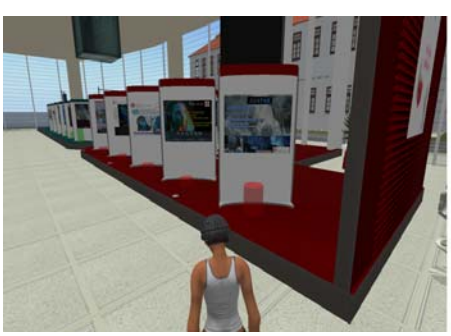
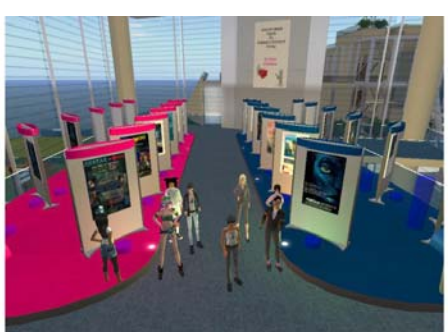
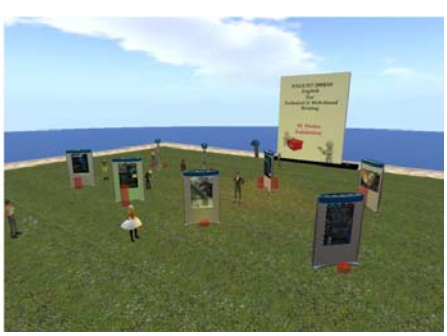
RESEARCH METHOD AND DESIGN

To provide multiple opportunities to develop proficient technical writing and design skills, the two teachers of four seminar groups assigned a task to a cohort of 82 students to create a movie poster used for an on campus viewing of the film, *Avatar*. Students were asked to submit their work through the WebCT. The collected movie posters were transferred to pdf format and exhibited in four zones in the two-storey virtual exhibition hall.

Every poster was numbered. Student avatars can anonymously cast one vote for the best poster by clicking the ballot in front of the display board.

Peer comments via note cards

In addition to voting, every avatar also wrote comments on a note card and deposited it to the nearest mailbox. The note cards were automa-

Snapshot 1.Ground floor of the exhibition hall. Snapshot 2.Second floor of the exhibition hall. Snapshot 3. Another location for faster access

tically gathered and processed to EXCEL file by the project manager. The criteria for the poster assessment were based on basic principles of graphic design: contrast, alignment, repetition and proximity. The exercise aims at raising awareness of standards and expectations, because students can internalize the standards when they use the assessment criteria to comment on peer work (Smith, Cooper, and Lancaster 2002). It is hoped that this can become a transferable skill, so that students develop evaluative expertise in other courses and in the workplace (Sluijsmans, Dochy and Moerkerke, 1998). Turnley (2005), however, posits that students may tend to favour speed and proficiency with technical tools over reflective issues such as audience, purpose, and argument in web design.

i-Feedback

The online survey aims to investigate student perception of e-learning via SL. It was done through i-Feedback on PolyU intranet with three statements in a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) and two open-ended questions (see Appendix A).

Focus group interview

The research questions were further examined by interviewing four focus groups with seven or eight students from each seminar group. The purpose is to supplement the i-feedback and share in-depth thought about SL with the tutors. The focus group interview concentrated on details of collaborative learning through peer assessment and the experience of using SL as a learning tool.

FINDINGS AND ANALYSIS

Peer critique on the notecards

Researchers have found that written comments can be more effective than providing grades (Hattie and Timperley 2007; Black and Wiliam 1998). Comments provided by peer groups can directly indicate student understanding of the criteria, particularly their ability to articulate suggestions for improvement. 71 notecards from the student avatars recorded comments on students' coursework. Majority suggested areas for improvement such as clarity of language, balance of poster, alignment of texts, proximity of contents, contrast of colour.

The following is a sample notecard:

Contrast:
- The big size of the name of the movie [arouse] people's interest
- The white colour of the wordings makes them stand out from the background
- The blue colour of the wordings in the bottom should be lighter so that they will be [clearer]
- The information about the cast and director should be in different [colours]

Alignment:
- The words are aligned with each other. This make them clear

Balance
- The words are arranged in balance

Proximity
- The words can be more widely apart

i-Feedback results

Of the 82 respondents, 76 successfully completed the survey. The results can be seen in Table 1.

Table1. Results of i-Feedback

No.	Statement	Mean	SD
1.	I believe Second Life is a useful environment for alternative assessments.	2.9	1.1
2.	I enjoyed creating a movie poster for displaying in Second Life.	3.2	1
3.	The design and layout for the poster display area was suitable for my viewing, evaluation, and feedback of my peers' work.	2.8	1.1

There are slight differences among the four seminar groups, but on the whole, the students found the virtual exhibition enjoyable and acceptable.

The open questions received a variety of answers. The replies to "*What were the most useful, meaningful, or important thing you learned in this session?*" indicated student awareness of the value of collaborative learning in a virtual environment:

S1: We can vote other students' work without any pressure as we use our nickname. Moreover, we can evaluate other students' work by putting comments in email box.

S2: The learning in Second life is a quite unique learning experience. The most useful things in this session is the new way to collect feedback and display our works.

S3: Interactive in the online platform. We can post comments and view each others work easily. It's also a cost effective way to share our work.

S4: We can have better interaction with our classmates by using SL, such as voting for the posters and post our comments.

S5: Good use of technology which is matched with lesson feature. Fair judgment as every student can enter into second life to vote for their [favorite] movie [poster] as well as leaving comments.

S6: Second Life is a very ..."amazing" tool for learning. This modern classroom provides all "Avatars" with a very comprehensive platform to communicate and host activities. I am deeply inspired with this tool for never can I imagine our learning environment can so vivid and real life like.

S7: Interactive in the online platform. We can post comments and view each others work easily. It's also a cost effective way to share our work.

S8: This new method of learning/playing/socialising is inspiring.

Feedback from focus group discussion

In the focus group discussion, the students gave positive feedback on the peer critique and new learning opportunities in SL. Many, however, also expressed frustration of being bogged down when more than 10 classmates logged into the virtual campus, which the project designer attributed to the inadequate capacity of computers in the lab. One student indicated a strong dislike towards SL because 'It is only a game'. We can argue, however, that "computer games not only require players to read and make meaning of symbols presented on the screen but to write and ultimately to revise their actions in the game relationship to these symbols" (Moberly, 2008). Even though Second Life is not a game – it does not have defined ends determining victory or defeat – it nevertheless retains many educational benefits as computer games require participants to complete goals. A number of students said they still prefer face to face integration and online learning tools like WebCT and blogs which they are more familiar with.

DISCUSSIONS

Far from being limited to a classroom presentation, the students' project became both local and global (Jarmon *et al.*, 2009) in that (1) the exhibition hall provides a meeting point on the virtual campus for students of different seminar groups. These students may have never met each other face to face due to different class hours (day time and evenings) and learning modes (full time and part time), and (2) the presence of the virtual campus in SL provides people around the world with the opportunity to walk (or fly) through. This extends a single poster task from individual contributions to a collective and collaborative learning environment so that learners share common interests, that is, to build a learning community, it is necessary to establish group goals and to hold individuals accountable for their contributions (Slavin, 1989).

Use of "collaborative dialogue" (Swain, 2000) in the form of notecards help students to mutually scaffold each other to find how best to express their intended meaning by giving and receiving assistance as they interact with each other. Conversations between peers form a critical component in engaging student learning (Laurillard, 2002). The Second Life environment simulates an authentic venue for students to demonstrate their performance and exercise evaluative skills. As a collaborative learning community, students could interact in class face to face as they work on the poster, and they probably reached beyond the third stage of 'information exchange' and were in the next stage of 'knowledge construction' described by Gilly Salmon (2002) in a five-stage model of online activities. In fact in one seminar group, students have addressed their peers on a first name basis, showing that the Second Life environment has become a social tool to mediate learning (Swain, 2000).

Technical challenges

The findings from the project reveal that negative opinion towards SL was not against the features and interactivities of virtual learning world, but against technical problems that hinder these functions. As Andreas et al (2010) noticed, primary drawbacks of the SL platform included hardware requirements, discussion coordination, lack of impulsiveness, scalability, disorientation, functionality familiarization, avatar preparation, lack of shareable applications, and limited

interaction. Assets included novelty of approach, distance learning support, multiple communication channels, and graphical representation. The technical challenges are two pronged:

Hardware:

(1) Environment setting

Computers must install a client viewer (Appendix A: Hardware Recommendations) to gather students in the virtual campus environment. The SL official viewer can be downloaded from SL website. However, in order to minimize the hardware demand, a third-party developed client viewer: "Kirsten S16" was employed, which is less demanding on computer capacity and quality of graphics card due to its ignorance on shadow or particle effect.

(2) Network speed

Due to the limited bandwidth allocated to the SL platform within campus, it is a big challenge to design and set up peer evaluation area with a satisfying speed. We had to demonstrate a large number of students work in an easily reachable and readable layout and maximize the performance of Second Life. To keep the setting "simple" and "smart", double-side exhibition boards were set up with concise design and located spaciously for easy control in navigation and viewing.

Software:

(1) User-friendly interface

In order to shorten the learning time for students to adapt to the platform, we designed a clear and easy way of peer evaluation. A one-click voting system and a mailbox for collecting comments are set up in the virtual exhibition hall. The student avatars could vote the best poster by clicking on the voting bar in front of each display board. They could further write comments on individual posters on note cards and easily drag-n-drop to "post" them through the mailboxes. The mailboxes are not only for posting comments but also for receiving comments. The avatars can click on the mailboxes to read the comments given to different posters.

To balance performance and user-friendliness, we numbered the posters and grouped them into four zones with different color for each seminar group. The posters were displayed on two floors for a more structured layout, as shown in Figure 1.

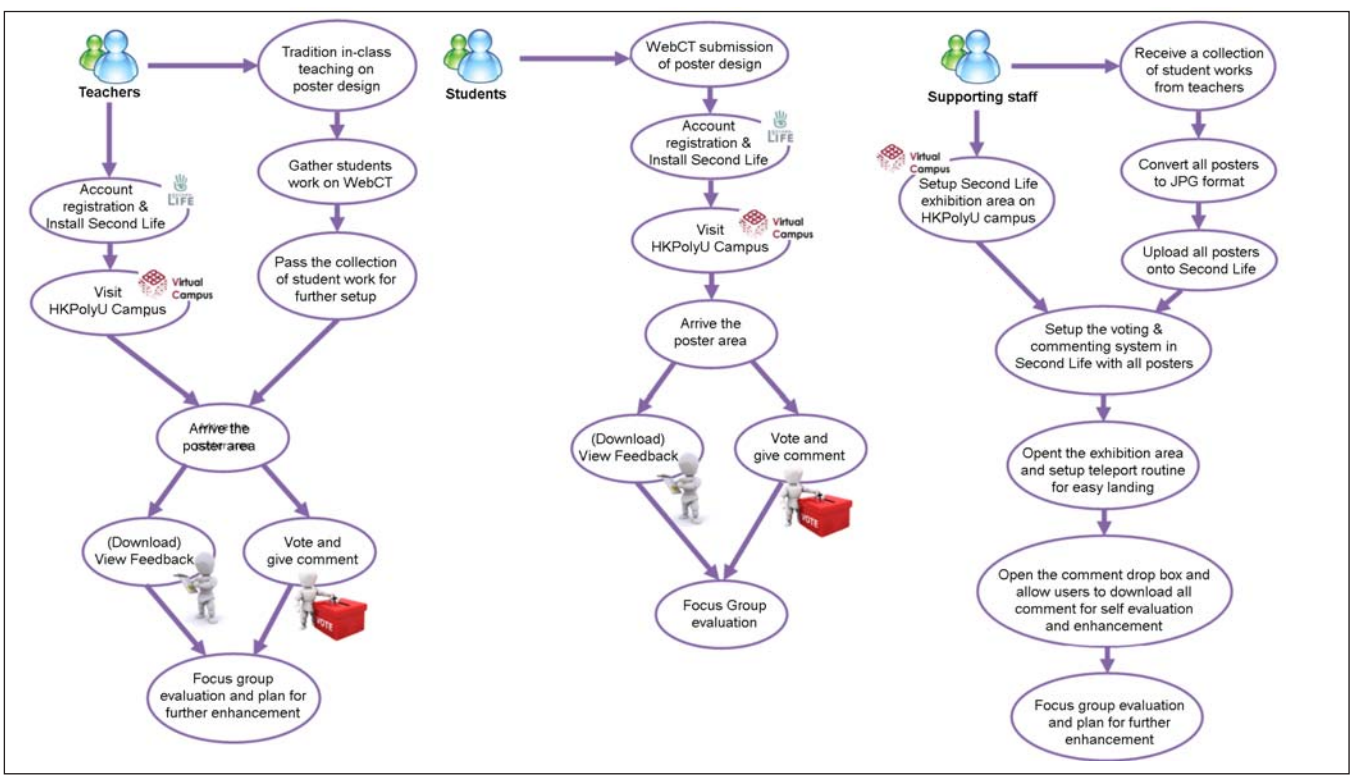


Figure 1: User diagrams concerning the activity design among stakeholders.

(2) Training workshop

Training is necessary for students who are almost illiterate in computer games. To help them with a smooth migration into the virtual platform, we provided a training session to explain what Second Life is, how to use the setup, and how to move around on the virtual campus. The students were given one week to familiarize with the virtual campus before they did the peer evaluation.

(3) Structural system design

To further enhance students' learning experience in the virtual campus, it is critical to provide students with a middle layer interface for an easy but high-degree involvement when posting their work and making comments on the virtual platform, such that they can have higher degree of immersion and motivation in self-learning in the virtual environment.

CONCLUSIONS

Our society has moved from the Information Age to the Age of Peer Production. Now that composition must include a variety of non-traditional genres to ensure relevancy, English departments are undergoing even greater impetus to change. In response to this, datagogies (under the pretext of "wisdom of crowds") are peer-review pedagogies that are subject to immediate revision, collaboration, and even deletion. They challenge traditional assumptions about authorship, authority, collaboration, and power (Moxley, 2008). The virtual learning environment proves to be an effective medium in facilitating the emergence of "a learner-centered discourse community" (Darhower, 2002). The direct online visualization and instant creating and retrieving the note cards enable the learners to "benefit from interaction, because the written nature of the discussion allows greater opportunity to attend to and reflect on the form and content of the communication" (Kern and Warschauer, 2000:15). It can motivate student learning and help them gain a deeper level of understanding of the potential of technology, extend their professional knowledge and life skills for all-rounded development.

In order to produce effective posters, students need to use principles of design and be technically competent on the virtual campus. The technical barrier is a challenge to some students, and this should not be overlooked when teachers integrate Second Life into the learning management system. To build professional competence, students first need to build confidence and develop critical evaluative expertise when selecting graphics and text for their posters, using software for designs and giving peer evaluations. In class and online tutorials on how to use the virtual campus would be important to build up students' skills of using Second Life. Technical development needs to be continued in order to avoid any delays or inconvenience when using Second Life as a group during class. As instructors in MUVE (multi-user virtual environments), we are responsible to help our students i) create an environment that facilitates the expansion of knowledge to students via building and exploring; ii) discover activities within virtual worlds that should be adapted to the abilities of the students; iii) produce lessons and objectives which can be implemented within a virtual world in addition to classroom instruction is encouraged; and iv) acquire knowledge and skills via use of MUVEs as an effective and powerful instrument for students who are digital natives (Burgess *et al*, 2010).

Working towards the common goal, students become contributing members by pooling their knowledge and resources for joint decision making and problem solving (Zeng and Taskatsuka, 2009). However, the students are still apprentices in the stage of knowledge construction in the field of professional design and technical writing. Many students demonstrated that they were capable of articulating valid and useful comments and suggestions and could internalize some of the assessment criterion. Because of trusting relationships, the comments made by peers invited the poster producers to reflect on their work for further improvement. Nevertheless, it is still not certain whether they reached the standards required by the workplace. To benchmark professional practice and standards, it would be useful to conduct further research into collaboration with professionals in a virtual world.

APPENDIX A. i-Feedback questions

Statements:

1. I believe Second Life is a useful environment for alternative assessments.
2. I enjoyed creating a movie poster for displaying in Second Life.
3. The design and layout for the poster display area was suitable for my viewing, evaluation, and feedback of my peers' work.

Questions:

- What were the most useful, meaningful, or important thing you learned in this session?
- What suggestions do you have on using Second Life in our learning?

APPENDIX B. Questions for focus group discussion

1. How did your learning change (either positively or negatively) because of the use of SL in this course?
2. What were some differences in learning in this course compared to other courses that do not use SL?
3. Did you visit any other virtual resources in Second Life or other areas of the PolyU virtual campus?
4. Apart from displaying posters, voting and commenting on other's work, what other ways could you use SL for this subject?
5. How are your experiences with and the comments you've received from both your SL poster going to help you with other project?
6. For what other types of learning activities do you think SL could be potentially helpful with your future university studies and career goals?

APPENDIX C. Hardware recommendations for providing a stable and satisfying environment to run SL:

WINDOWS	MIN. REQUIREMENTS	RECOMMENDED
Internet Connection*:	Cable or DSL	Cable or DSL
Operating System:	2000, XP, or Vista	XP or Vista
Computer Processor:	800 MHz Pentium III or Athlon, or better	1.5 GHz (XP), 2-GHz (Vista) 32-bit (x86) or better
Computer Memory:	512 MB or more	1 GB or more
Screen Resolution:	1024x768 pixels	1024x768 pixels or higher
Graphics Card for XP/2000:**	• NVIDIA GeForce 2, GeForce 4 MX or better • **OR** ATI Radeon 8500, 9250 or better • **OR** Intel 945 chipset	**NVIDIA Graphics cards** 6000 Series: • 6600, 6700, 68007000 Series: • 7600, 7800, 79008000 Series: • 8500, 8600, 8800 GeForce Go Series: • 7600, 7800, 7900 • X800, X900, X1600, X1700, X1800, X1900 • x2600, x2900 • x3650, x3850
Graphics Card for Vista (requires latest drivers):**	• NVIDIA GeForce 6600 or better • **OR** ATI Radeon 9500 or better • **OR** Intel 945 chipset	**NVIDIA Graphics cards** 7000 Series: • 7600, 7800, 7900, 8000 Series: • 8500, 8600, 8800 GeForce Go Series: • 7600, 7800, 7900 **ATI Graphics Cards** • X1600, X1700, X1800, X1900 • x2600, x2900 • x3650, x3850
Mac OS	**MINIMUM REQUIREMENTS**	**RECOMMENDED**
Internet Connection*:	Cable or DSL	Cable or DSL
Operating System:	Mac OS X 10.4.11 or better	Mac OS X 10.5.4 or better
Computer Processor:	1 GHz G4 or better	1.25 GHz G4 or better
Computer Memory:	512 MB or more	1 GB or more
Screen Resolution:	1024x768 pixels	1024x768 pixels or higher
Graphics Card **:	• ATI Radeon 9200 and above • **OR** ATI Radeon X Series • **OR** NVIDIA GeForce 2, GeForce 4 • **OR** NVIDIA GeForce 5000 Series and above	• ATI: X1600, X1900, X2400, X2600 • **OR** NVIDIA: 6800, 7600, 7800, 8800
LINUX	**MINIMUM REQUIREMENTS**	**RECOMMENDED**
Internet Connection*:	Cable or DSL	Cable or DSL
Operating System:	A reasonably modern 32-bit Linux environment is required. If you are running a 64-bit Linux distribution then you will need its 32-bit compatibility environment installed.	A reasonably modern 32-bit Linux environment is required. If you are running a 64-bit Linux distribution then you will need its 32-bit compatibility environment installed.
Computer Processor:	800 MHz Pentium III or Athlon, or better	1.5 GHz or better
Computer Memory:	512 MB or more	1 GB or more
Screen Resolution:	1024x768 pixels	1024x768 pixels or higher
Graphics Card **:	• NVIDIA GeForce 2, GeForce 4 MX, or better • **OR** ATI Radeon 8500, 9250, or better	**NVIDIA Graphics cards** 6000 Series: • 6600, 6700, 6800, 7000 Series: • 7600, 7800, 7900, 8000 Series: • 8500, 8600, 8800 GeForce Go Series: • 7600, 7800, 7900

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