AC 2007-2032: OUTREACH WITH GAME DESIGN EDUCATION

David Schwartz, Cornell University

After finishing his dissertation in Civil Engineering and writing two textbooks as a graduate student in 1999, Cornell's Computer Science department made an offer David I. Schwartz couldn't refuse. Schwartz has made a career in researching and developing new curricula and educational technology. Over the past five years, he has collaborated with faculty and staff to build the Cornell Library Collaborative Learning Computer Laboratory (CL3) and the Game Design Initiative at Cornell (GDIAC; http://gdiac.cis.cornell.edu). CL3 currently hosts Cornell's new game courses, which now

belong to a new Minor in Game Design (in the College of Engineering) starting in Fall 2006. Schwartz is continuing to develop material for the Minor and also works as a software consultant to the Air Force Research Laboratory.

Catherine Norton, Cornell University

A former doctoral student in clinical psychology at Syracuse University, Catherine Norton has research interests that range from adolescent development/motivation to education and learning in 3D Virtual World computer environments. Catherine is currently serving as the Outreach Program Coordinator for the Cornell Theory Center where she creates new assessment tools, conducts program evaluations, analyzes data and reports findings. She also provides program demonstrations, develops new programs and teaches workshops. Catherine is very interested in collaborative research projects, both on campus and off. She was pleased to assist Dr. Schwartz with the evaluation of the GDIAC intern project.

Sue Schwartz, The Learning Web

Sue Schwartz has been an apprenticeship coordinator for The Learning Web for six years. An Ithaca native, she finds great satisfaction in connecting youth from her home town to opportunities where they can learn about their interests, talents and the world of work. Sue feels we could all use mentors in our lives, and takes pride in the mutually beneficial relationships youth in her program form with their adult and college student mentors.

Outreach with Game Design Education

Abstract

Many universities and colleges are currently developing game design and development courses in response to student demand. Whereas some programs explore outreach opportunities via summer programs, the integration of service learning and K-12 outreach with college game courses is rare. We started a pilot program in Fall 2003 to research how educators can involve local youth (middle- to high-school level ages) directly within college game courses and thus offer a low-cost (and possibly, free) outreach program. In this paper, we explain our program structure and present our findings. The data shows that apprentices were positive about their experiences, though they requested additional hands-on instruction. We close the paper with recommendations and plans that attempt to combine the ideas of in-class mentoring along with traditional instruction.

1. Background

This section explains the various fields that we used to build our pilot outreach program: game design & development, mentoring & apprenticeship, and service learning. Our program merges these concepts such that college students involve local youth directly in game projects during class.

1.1 Entertainment Engineering

ASEE's January 2005 Prism introduced *entertainment engineering* as a growing area to attract students[1]. Some example programs include University of Nevada's *Entertainment Engineering and Design* program[2] and Carnegie Mellon University's *Entertainment Technology Center* (ETC)[3]. Students work in multidisciplinary teams, combining fields of engineering, science, the arts, and humanities, to create class projects that involve fun for the users and the student developers. Such work appeals to students for a variety of reasons, which include expression and development of creativity, teamwork, and communication skills. The appeal of creating entertaining and challenging projects helps motivate students in their core courses. The possibility of a career in entertainment engineering provides further incentive to take technical courses.

1.2 Game Design and Development

Entertainment technology splits roughly into two categories: hardware and software. Whereas hardware might range from toys to amusement rides, software involves virtual and interactive experiences, i.e., *games*. Some programs, like ETC, often bridge both areas. The process of making a game closely relates to the engineering process, in which designers plan an environment composed of physical and/or virtual constructs that interact according to a set of rules. The developers employ technology to implement the plans, working in an iterative fashion in collaboration with the designers[4, 5].

1.3 Games and Education

The popularity of games has spurred on a large industry. The Entertainment Software Association reports sales 2006 sales figures of seven billion dollars, which puts the game industry on par with the film industry[6]. With such popularity, many children dream of becoming videogame designers, perhaps becoming the next Will Wright (original designer of all-things "Sim"). A new field in *serious games* (i.e., games for training, education, health, and other practical applications) also drives academic interest[7]. For example, a large team of developers and researchers at Purdue University are making a videogame that helps to teach chemistry[8].

Hundreds of schools have tapped into interest in games, offering multidisciplinary programs that merge liberal and technical studies[9, 10]. In 2001, David Schwartz began development of a program in game design education (The Game Design Initiative at Cornell [GDIAC[11]]), which culminated in the approval of a new Minor in Game Design offered in the College of Engineering. GDIAC focuses on design, whereby artists, writers, musicians, and engineers work together on original games. At Cornell University, students may split development duties, offering an outlet for exploring liberal studies in the context of an engineering class. This flexibility helped to develop an outreach program by creating opportunities for students lacking technical backgrounds.

Another important feature in game courses is public exhibition. Academic programs in games typically post, distribute, and/or demonstrate games for the public. Given the public display, the student games tend to be "kid friendly," which helps to generate interest from local youth.

1.4 Mentoring and Apprenticeship

One of the earliest, if not the first, programs to combine apprenticeships with mentoring, The Learning Web (TLW) provides youth with hands-on learning opportunities Tompkins County[12]. Since it was founded in 1972, almost 10,000 youth have explored career interests as diverse as marine biology, law, watch repair, civil engineering, glass making, medicine, archeology, exotic animal care, and computer graphics. Each year community mentors volunteer approximately 10,000 hours sharing their expertise and workplaces with youth through TLW. This one-on-one relationship teaches young people valuable job and life skills and empowers them through increased self-awareness and self-esteem to make a successful transition to the world of adult roles and responsibilities.

Youth who participate in TLW have a wide range of needs and interests–from the highly motivated student seeking educational enrichment, to the average student who needs to see the "real world" relevance of her school work, to the middle-school student just beginning to explore his community. Homeless and transient youth and young adults receive outreach services, intensive case-management, independent living skills training and paid apprenticeships through the TLW in order to assist these youth in developing the skills necessary for a self-sufficient, productive life.

1.5 Service Learning

The call for incorporating *service learning* in the engineering curriculum is quite strong[14]. See also Purdue University's EPICS program[15]. Although engineering service learning projects often involve working the community to solve problems, service learning could involve in-class mentoring, which forms the basis for our study.

2. Outreach Program Description

In this section, we describe the development and structure of our pilot outreach program, which evolved during early stages of GDIAC development.

2.1 Constraints

Although Cornell University's game courses were still in development when TLW approached GDIAC, we realized that we had a unique opportunity to test a relatively unique outreach program. Granted, we faced numerous constraints, as follows:

- Course material still in development.
- Limited instructor availability.
- Scarcity of artists and musicians.
- After-hours class time.

The hardest constraints were two common insufficiencies: staffing and funding. In particular, GDIAC could not screen apprentices, run background checks, and perform other activities usually associated with a funded outreach program.

2.2 The Plan

GDIAC and TLW realized that flipping these disadvantages around could form an experimental outreach program that incurred relatively little extra cost to either organization. We decided to have interested youth join college students directly *within* the game courses and work alongside each other. If we could demonstrate that this approach would engage the participants, then we could offer a template for a relatively cheap way to provide an outreach program. Moreover, we could show how academic groups could partner with local community organizations using games.

2.3 The Outreach Program

Our outreach program found college student volunteers who mentored with *apprentices* (also called *interns*). TLW gathered a list of prospective apprentices, screened by the course instructor(s). While the college student groups coalesced early in the semester, the instructor called for mentors and matched apprentices to them. The apprentices then attended one class each week, meeting with the mentors and the game groups. Sometimes an apprentice received formal skill training, though in most cases an apprentice participated directly in the development of their mentor's project.

When GDIAC first started, most students were computer science majors, which left vacant spots in art, creative writing, and music. The apprentices helped to fill those roles in the student teams. Since GDIAC's courses involve significant group time during class, the apprentices could contribute to student projects each week. Moreover, as a game's design evolved throughout the semester, an apprentice could offer feedback, akin to a small "focus group," helping to keep the group connected to their intended clients. There were some cases in which the apprentices simply "sat in" on a group to experience an advanced student project, getting a feel for college. By providing opportunities for mentoring community youth in class, we were able to adapt the notion of service learning. College students gained an opportunity to mentor youth, and thus, perform community service without greatly increasing their workload. In fact, GDIAC college students already engage in mentoring because of the multidisciplinary nature of game courses.

The after-hours class time helped establish a common meeting time. The college students had vastly different schedules, especially as GDIAC began to attract more non-computer science students. Running classes at 5:00 PM inadvertently created an opportunity for youth apprentices without affecting college mentor schedules. Rather than confronting issues of the public school system and complexities of transporting college students, we opted for bringing apprentices to us. Although we shifted some burden to apprentices and parents for transportation, we offered apprenticeships for free.

One particular advantage in this collaboration is TLW's built-in safeguards and screening. Whereas GDIAC lacked the resources and staffing for handling youth, TLW is an external organization, which provides an established administrative and legal infrastructure for handling apprentices. In 2005, we expanded our pilot program to include *SciCentr* at Cornell University to provide additional administrative support[13].

2.4 Advertising and Recruitment

Although games capture the interest of kids (and many older folks–the average game player age is 33[6]), we still needed to create pathways to communicate with parents, their children, and community organizations. In Fall 2003, two years after GDIAC began, local youth became aware of its existence through two means:

- Established connections to TLW through other departments.
- Advertising of each semester's public game showcase.

In terms of local connections, larger schools often have outreach coordinators and/or administrators. In our case, TLW had numerous requests for finding "game development mentors," which ultimately connected TLW with GDIAC. In 2005, we also established additional local connections with the Fingerlakes Unschoolers Network (FUN)[23]. Home-schooled students have an opportunity to embed game education as part of their educational programs.

Each semester GDIAC holds a public showcase as part of the final game project, as described in Section 1.3. Such showcases have become common for academic game programs, especially because the games have a virtually guaranteed audience. The showcase also serves as a contact

point for many parents to meet the instructors and college students, which helps to assuage concerns and explain the outreach program.

For schools interested in starting a program, we generally find no lack of interest with local youth. If anything, we have too much interest given our current mentor/apprentice model. In our recommendation section, we discuss plans on how we hope to accommodate larger group sizes by incorporating more hands-on instruction.

2.5 Course Content and Structure

The game courses at Cornell University focus on design, whereby students conceive of a game based on genre, story, game mechanics, art, music, and feasibility. By learning how to plan their ideas and coordinate with the design process, students develop the entire game. Such pedagogy is common throughout game courses[16].

The game courses at Cornell University originally began as structured independent study courses, akin to special topics courses. Though the courses have since formalized, they retain much of the original philosophy, whereby students use part of class time for group meetings and project review. Originally, the classes would primarily serve as time for meetings, review, and presentation. Currently, the game courses have established lecture components but still provide time for group work.

2.6 Related Work

Using games for outreach to attract K-12 students is not new. For example, engaging in game assessment can engage students[17]. For our program, there is a degree of assessment, in that apprentices engage in the design process throughout the development of a game. Many other programs offer more direct instruction of game development and related skills (e.g., game programming, animation, and modeling)[18]. In many cases, these programs work in collaboration with universities, often during the summer[19, 20]. There is also an established (and still growing) field of academic research in studying the educational impact of children designing and making their own games[21]. Although we developed our collaboration independently, there is established collection of university and community links, which often involve students teaching in after-school programs[22].

3. Results

In this section, we describe the apprentices and their reactions. We have included individual responses in the appendices at the end of this paper.

3.1 Data Collection and Demographics

We ran our pilot program in two main phases:

- Phase 1 (Fall 2003–Spring 2005), which involved only GDIAC and TLW.

- Phase 2 (Fall 2005–Spring 2006), which added SciCentr[13] and FUN[23]. SciCentr offered to assist with screening and organization, which helped us bring in FUN students.

We present basic background information for TLW participants in Table 1. Given enrollment of approximately 30 college students each semester, we aimed for about 10–20% youth participation to keep group sizes manageable and still fit inside our computer labs. As a result, the number of participants may seem small, but as a group, it was a significant portion of the course each semester. Moreover, an essentially free program will need to have size limitations, especially when adding students to a course–the apprentices will scale to the class size. We address the issue of ways to increase enrollment numbers without scaling in our recommendations section.

Table 1: Participant Background in TLW

Year	Gender	Ethnicity	Age
2003	Male	Caucasian	18
	Male	Caucasian	14
	Male	Caucasian	14
	Male	Caucasian	16
	Male	Caucasian	15
	Male	Caucasian	13
2004	Male	Caucasian	15
	Female	Asian	15
	Female	African American	18
	Male	African American	14
	Male	Caucasian	15
	Female	African American	19
	Male	Caucasian	18
2005	Male	Caucasian	16
	Female	Asian	16
	Male	Caucasian	12
2006	Male	Caucasian	17
	Male	Caucasian	13
	Male	Multi-racial	14
	Male	African American	18
	Male	African American	14

3.2 Program Data

Working within TLW and Human Subjects guidelines, we collected formal participant responses from surveys. In some cases, students either refused or neglected to fill out surveys. With the added help of SciCentr during Phase 2, we were able to standardize our data collecting. Phase 1 data is available via the GDIAC website (as of June 2007). Phase 2 formed a more in-depth structure for data collection and assessment, which we believe is more useful for adoption by other programs. We present the main results of Phase 2 results below.

In Fall 2005, seven students applied for the program. Two were recruited from TLW and five were recruited from FUN. Five students were accepted. Of the five, two were from TLW and three were from Ithaca High School. One TLW student dropped out mid-semester, due to personal/ family problems. Another student dropped out toward the end of the semester, citing lack of involvement in his team as the primary reason. He was a FUN student. Three completed the semester. Of these three, one was a TLW student and two were FUN students. We collected other information, as follows:

- One student reported attending public school. The other four stated that they were home-schooled.
- One student was in 6th grade, three were in 8th grade and one was in 10th grade.
- One student was 12, two were thirteen, one was 14 and one was 15 years old.
- All of the students were male.
- Four of the students indicated that they were Caucasian. One indicated “Mixed/Other.”
- All of the students indicated that this was their first apprenticeship with us.

Students reported diverse career aspirations: musician, professional athlete, photographer, computer scientist and game designer. At the end of the semester, the musician said he still wanted to become a musician, the would-be professional athlete stated he was now interested in engineering and the would-be computer scientist was now interested in becoming a stock broker.

Students were asked who had the most important job on the game development team. The choices were programmer, writer, artist/animator, musician/composer, game designer, game producer (group leader) or ‘they are all equally important.’ At the beginning of the semester, four of the five said they are all equally important. The remaining one said the computer programmer. The responses did not change for the three students who completed the semester.

In Spring 2006, thirteen students applied for the apprenticeship. Five were recruited from TLW and eight were recruited from FUN. Eight students were accepted. Of the eight, three were from TLW and five were from FUN. One TLW student dropped out after only two sessions, due to transportation problems. Seven apprentices completed the semester. Pre- and post-data was obtained from only four participants, all FUN students. We collected other information, as follows:

- Three students said they attended public school. One stated that he was home-schooled.
- One student was represented from 7th, 8th, 9th and 12th grade.
- The students indicated their ages were 12, 13, 14 and 17 years old.

- All of the students were male.
- Two of the students indicated that they were Caucasian. One indicated “Mixed/Other” and another indicated “Asian/Pacific Islander.”
- Three of the students indicated that this was their first apprenticeship with us. One said he participated once before.

The students reported diverse career aspirations: engineering, software engineering, computer programming and a tri-career of “economics/physics/computer science.” At the end of the semester, the software engineer said he still wanted to become a software engineer, the computer programmer became more specific saying he wanted to be a computer game programmer, the “economics/physics/computer science” student said he was now interested in “economics/mathematics,” and the engineer now specified civil engineering as his career aspiration.

The students were asked who had the most important job on the game development team. The choices were programmer, writer, artist/animator, musician/composer, game designer, game producer (group leader) or ‘they are all equally important.’ At the beginning of the semester, three of the four said they are all equally important. The remaining one said the computer programmer. At the end of the semester, two indicated computer programmer as being most import, while the other two said they are all equally important.

3.3 Survey Responses

Phase 1 students used TLW’s standard apprentice review form, which is available by request from TLW. In Phase 2, we worked with SciCentr at Cornell University and asked questions related specifically to game design. We summarize key questions that allowed for numerical ranking in Table 2, which shows that most responses ranged from middle to high. Another indication of positive reaction are the responses to the question, “Would you recommend this program to others?”, as follows:

- Yes, it would be a good experience if they were interested in game design
- Yes, it is a lot of fun and I’ve learned tons
- No, not involving enough
- Yes, The internship provides a glimpse into what things are like beyond high school in the games industry, not to mention great resources for someone eager to learn.
- Yes, Because everybody likes games but when you go behind the them (how to make them) it is even cooler.
- Yes, It was a fun experience where you learn new skills, in my case, about artificial intelligence.
- Yes, I was able to learn tons of stuff from my mentor and the GDIAC internship is an incredible opportunity for kids like me.

Table 3 summarizes responses to questions posed in Phase 2, using seven-point, Likert-type scale ratings before and after participation in the outreach program each semester. Given the relatively similar numbers and small population, we do not believe that the differences between pre- and post-comparison data are statistically significant, though the number of apprentices ranged between 10–20% of class size. Refer to the GDIAC website[11] for the complete set of responses.

Table 2: Numerical Evaluations

Phase	Question	Sample Size	Mean
1	Reach goals in learning contract? (1=did not meet goals, 3=met goals, 5=exceeded goals)	9	3.44
	Influence of apprenticeship on career plans? (1=did not influence, 3=increase, 5=significant increase)	9	4
	Apprenticeship increase knowledge of field? (1=no increase, 3=increase, 5=significant increase)	9	3.89
2	Overall program rating? (1=Poor, 7=Excellent)	7	5.86
	Helpfulness of mentor? (1=Not at all, 7=Extremely)	7	5.86

4. Conclusions

We have shown that it is indeed possible to create a relatively cheap, but successful, outreach program by including about 10–20% apprentices in a game class. The advantage in game design and development classes is that students who lack technical expertise can still offer design suggestions and contribute greatly to writing, music, and art. By being involved directly in a college project, an apprentice gets early exposure to college life without resorting to separate summer programs. The college students also get a relatively easy way to engage in community service without having to worry about transportation.

Overall, the survey results show that the apprentices who chose to share their reactions have been very positive about our outreach program. The apprentices report positive experiences about certain mentors, especially those that took an active interest in integrating the apprentices' work in a game. Even a musician who preferred "rock" to "techno" indicated that he was included in the college student group. In terms of skill development, the surveys indicate the responders believed that their knowledge grew.

Do we inspire students to pursue technical studies? The surveys show mixed results. For example, the pre- and post-comparison data in Table 3 indicates little change in attitude. The survey responses seem more indicative of apprentice reactions. Responders refer positively to college, sometimes indicating a need to stop "slacking." Another interesting aspect is that we may have intensified interest in music or art. Although some game programs hope to bolster interest in computer science, we feel that by encouraging disadvantaged students to take academic life seriously, our program is a success.

In terms of our program structure, the responses do show a common critique, especially in cases of apprentices relegated to witnessing the college students. Anecdotally, some of the youth and parents relayed their appreciation of being able to witness what college can be like. But the responses do show that a number of apprentices needed and wanted more interaction or direct

Table 3: Phase 2 Pre- & Post-Comparison Mean Scores

#	Question	Fall 2005 *n*=3		Spring 2006 *n*=4	
		Pre	Post	Pre	Post
1.	College plan	7.00	6.33	6.50	7.00
2.	Interest in computer science career	4.33	4.00	5.75	5.75
3.	Interest in game industry career	4.33	2.67	5.50	5.00
4.	Interest in game design career	3.33	3.00	5.00	4.25
5.	Knowledge of game design	1.33	1.67	4.00	3.25
6.	Teamwork is important	6.00	6.00	6.50	6.25
7.	Comfort in a team	6.00	5.00	6.25	6.25
8.	Interest in computer programming	4.00	4.50	6.50	6.25
9.	Interest in creative writing	3.00	4.00	4.25	4.00
10.	Interest in art	4.50	4.00	5.00	4.50
11.	Interest in music	7.00	6.50	5.50	5.50
12.	Interest in game design	3.50	4.50	5.50	5.00
13.	Talent in computer programming	2.00	2.33	4.00	3.75
14.	Talent in creative writing	3.33	3.33	4.25	4.25
15.	Talent in art	1.33	3.00	3.50	4.00
16.	Talent in music	3.67	4.00	5.00	5.00
17.	Talent in game design	1.33	2.00	3.75	3.25

instruction. Note that apprentices did not request actual lectures–in fact, there are a few negative responses even though we had very few lectures initially.

The most successful models appeared to be mentors who took time to teach particular skills needed for the group's game. For example, one of the music apprentices has worked with GDIAC for almost four years, contributing to many student projects. Some responses encourage the approach of programs in which youth make their own games.

5. Recommendations and Future Work

For schools interested in building such a "free" outreach program, we offer the following recommendations based on our experiences and results. Although you might be restricted to scaling participation based on college class size, this model can run every semester given a collaboration with a local youth program.

Surveys: When we started the program, we were unsure of its viability and the issues we needed to address. However, game design and development classes are becoming common with better understood curricula. The added stability and our survey questions should help programs get started. We strongly recommend including parent and mentor surveys in the process. The parent surveys could also improve lines of communication to the apprentices. For example, calling parents or inviting them to group presentations can help to strengthen support for keeping an apprentice involved (especially if transportation to class is required).

Training and screening: We suggest providing additional training support from the local youth organizations for the mentors, perhaps in the form of a service-learning course or as extra credit within the game course. In terms of apprentices, we originally did not know who to accept. In time, we learned about trying to match group needs with apprentice interests with which local youth organizations can also assist.

As of Spring 2007, GDIAC's last independent study project needed to move to a "regular" class time, which has put the after-school class temporarily on hold. However, we are re-evaluating our work to date to incorporate the above recommendations. Many youth did indicate a desire for more "hands-on" training. By running a separate course on "game design for kids" led by college students, the students could assign specific tasks that relate to a current game project. Thereby, we might be able to provide both an opportunity for learning and integration in a student project.

Bibliography

1. Grose, T. K., "The Science of FUN," *ASEE Prism*, Volume 14, Number 5, 2005, http://www.prism-magazine.org/jan05/tt_science.cfm.
2. Entertainment Engineering and Design, University of Nevada, Las Vegas, Howard R. Hughes College of Engineering, http://www.eed.egr.unlv.edu/index.cfm.
3. The Entertainment Technology Center, Carnegie Mellon University, http://www.etc.cmu.edu.
4. Salen, K. and Zimmerman, E. *Rules of Play: Game Design Fundamentals*, The MIT Press, 2003.
5. Adams, E. and Rollings, A. *Game Design and Development: Fundamentals of Game Design*, Prentice Hall, 2006.
6. The Entertainment Software Association, "The Essential Facts about The Computer and Video Game Industry," http://www.theesa.com/archives/files/Essential%20Facts%202006.pdf.
7. Serious Games Initiative, http://www.seriousgames.org.
8. Nattam, N. et al, "The Design Process of A Chemistry Video Game," *Proceedings of the 2006 Conference of the American Society for Engineering Education (ASEE 2006),* 2006.
9. Wu, Corinna, "Monsters on The Move: A Slew of Schools are Preparing Students to Work in The Computer Game Industry," *ASEE Prism*, Volume 16, Number 5, 2007, http://www.prism-magazine.org/jan07/tt_01.cfm.
10. Gamasutra – The Art & Business of Making Games, http://www.gamasutra.com.
11. The Game Design Initiative at Cornell (GDIAC), http://gdiac.cis.cornell.edu.
12. The Learning Web (TLW), http://www.learning-web.org.
13. Cornell University SciCentr, http://www.scicentr.org.
14. Jawaharlal, M., Fan, u., and Monemi, S. "Implementing Service Learning in Engineering Curriculum," *Proceedings of the 2006 Conference of the American Society for Engineering Education (ASEE 2006),* 2006.
15. EPICS: Engineering Projects in Community Service, http://epics.ecn.purdue.edu.
16. Curriculum Framework, International Game Developers Association, http://www.igda.org/academia/curriculum_framework.php.

17. Lyons, L. and Zbigniew, P. Enhancing Engineering Outreach with Interactive Game Assessment, *Proceedings of the 2006 Conference of the American Society for Engineering Education (ASEE 2006),* 2006.
18. Emagination Computer Camps, http://www.computercamps.com/computer/summer_camp.html.
19. FivePoints, Union College,http://www.union.edu/fivepoints.
20. VideoGame.NET Experience Animation and Web Design, http://www.gv.psu.edu/Continuing_Education/Youth_Programs/VideoGame.Net_Experience; see also http://VideoGame.net.
21. Kafai, Y. Minds in Play: Computer Game Design As a Context for Children's Learning, Lawrence Erlbaum Associates, 1994.
22. University-Community Links (UC Links), http://www.uclinks.org.
23. Fingerlakes Unschoolers Network, http://www.lightlink.com/hilinda/fun.html.