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Learn to Play, Play to Learn: Building a Better Educational Game

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Abstract

Educational games have had a troubled history. At their worst, they have been neither educational nor games; even at their best they have faced scepticism from educators, game designers and especially children. The standard response to being given an educational game – *This is supposed to be fun?* – might be compared to finding a Brussels sprout at the centre of a Tootsie Pop. Teachers, meanwhile, are rightly concerned that the educational content of these games might be outweighed by the entertainment value. Already loaded down with curriculum that has to be delivered, many educators feel they don't have the time to spare on anything but direct instruction.

Identifying the need for an Internet literacy game

Media Awareness Network (MNet), Canada's leading media education organization, conducted research in 2005 that investigated children's use of new technologies. Results from this study, titled Young Canadians in a Wired World (Steeves & Wing, 2005) (the most comprehensive and wide-ranging study of its kind in Canada), convinced MNet that there was a need for a comprehensive Internet literacy resource that could be used in elementary and intermediate classrooms.

The research showed that young people are actively interested in learning more about their online environments. In focus groups, young people articulated that what they need from adults is more information about the kinds of content they find online so they can make informed choices about what they choose to see, as well as training in how to protect their online privacy and how to avoid undesirable content. The interest is highest among the children in Grades 4 to 6. This is a particularly important time to learn these skills because kids in these grades are playing on commercial game sites that actively seek to collect their personal information, and, by Grade 6, students are exploring edgier Web sites.

These were our concerns as we began the development of *Passport to the Internet*, an Internet literacy tutorial for Grades 4-8. As we listed the areas we hoped to cover - understanding safety, marketing and privacy issues, authenticating information found on the Web, managing online relationships and dealing with cyber bullying - it quickly became clear that *Passport to the Internet* would be a very ambitious project. Media Awareness Network had already produced several educational games, such as the award-winning *CyberPigs* series. Most of these, however, weren't games in the proper sense but rather animated stories, which were occasionally interrupted with quizzes. With the amount of content it would need to deliver *Passport to the Internet* had to be more interactive than our previous endeavours but still maintain a game-like atmosphere so that students would play through each of the modules with little encouragement from their teacher. Could we achieve this without sacrificing its educational value? Was it even possible for a game to teach complex skills like these?

Learning through games

Given the relatively brief history of educational games, it might come as a surprise that the question is an old one. One of our oldest games, chess, was traditionally seen as a preparation for war, and in 1989 David Perkins and Gavriel Salomon designed a thought experiment to test whether or not it actually did so. They imagined that a small country, home to the world's greatest chess master, was invaded by its larger neighbour. The citizens of the invaded country immediately put the chess master in charge of their military, reasoning that his skill on the board would transfer to the battlefield. In designing this scenario, Perkins and Salomon raised the question of just how we learn: is it more important to develop skills with broad application, that might move back and forth between related fields (such as chess and war), or were the skills specific to each context more important? In his book *Schools For Thought*, John Bruer (1993) revisits this problem, applying recent advances in cognitive theory to show that neither answer is entirely true: the chess master will not automatically be a great strategist in the real world-the two situations are too different-but some of his specific skills may transfer to the new context.

The word "transfer" is key to understanding why some educational games work and some don't. In cognitive theory, it's used to refer to the ability to apply skills acquired in one context to another. In general, the more similar two contexts are, the easier it is to transfer from one to the other. Learning Spanish grammar, for example, will help you learn Italian grammar, but not Russian grammar, because Spanish is similar in structure to Italian but not to Russian. The catch is that strategies which are applicable to the most contexts are also generally the least useful: cognitive scientists call these *weak methods*. Conversely, those skills most dependent on specific understanding of a particular context, called *strong methods*, are the most effective, but are also, for obvious reasons, the hardest to transfer.

Transfer is, of course, important in all educational situations. One of the greatest challenges facing any teacher is to get students to transfer what they learn in the classroom to other situations (the test being the world outside of the school). This is

especially important in educational games, because by definition their worlds, like a chessboard, are artificial; any similarity to real-world contexts has to be designed into the game. It's entirely possible to acquire mastery of a game without learning any skills that can transfer to other contexts (except, perhaps, to other games).

Why use games for education at all, then? Because players *do* acquire mastery, often with amazing commitment and speed. Many writers, from game designers such as Will Wright (*Sim City*, *Spore*) and Scott Osterweil (*Labyrinth*) to academics such as Henry Jenkins and Constance Steinkuehler, have noted that computer game players learn how to succeed at games through an application of the scientific method. As Wright (2006) puts it, "Just watch a kid with a new video game. The last thing they do is read the manual. Instead, they pick up the controller and start mashing buttons to see what happens. This isn't a random process; it's the essence of the scientific method. Through trial and error, they begin to master the game world. It's a rapid cycle of hypothesis, experiment, and analysis" (p. 110). Constance Steinkuehler and Sean Duncan (2008) even suggest games may teach hypothesis-testing better than traditional science education: "Poincaré warned against the seduction of reducing science to a domain of seeming facts, stating, 'Science is built up of facts, as a house is built of stones; but an accumulation of facts is no more science than a heap of stones is a house'" (p. 530). As well, games are well suited to independent learning because they can allow students to learn at their own pace: each student moves through the game separately, progressing at whatever speed best suits her.

Design issues

In designing *Passport to the Internet*, we knew there were several major issues we would have to address for it to be successful. The most important was the question of transfer: could we really teach Internet literacy skills, or would users only learn how to succeed at the game? For this reason, we decided that the core of the game would be *simulation*; the modules would reproduce genuine online environments as closely as possible. For instance, our teaching privacy management skills module is a simulated social networking site that combines elements of *Facebook* and *MySpace*. Due to this choice, we were able to teach specific skills, or strong strategies, that would transfer directly to the actual Internet: a student could, for instance, use the exact same techniques used to analyze the game's fictional Web sites to judge real ones.

To take advantage of the learning potential of games, we wanted *Passport to the Internet* to reward exploration and experimentation. Although we wanted there to be consequences to success and failure (it's not really a game if you can't fail), we decided that failing should be a fairly minor event. (It's worth noting that in *World of Warcraft*, the most popular online multiplayer game, death itself is basically an inconvenience). We therefore let users replay any module as many times as needed and as soon as they want to, but also always give the option of moving to another module and coming back later, so they can take a break if they become frustrated. For that same reason, the modules are designed such that they can be completed in any order (except in one

case where skills learned in one module are necessary to complete another one) and we allow users to complete the game over multiple sessions.

Because the teachers who will be administering *Passport to the Internet* in the classroom are not necessarily experts in the skills we hope to teach (though we offer a detailed Teacher's Guide to provide background), we provide as much of the educational content as possible on demand, to be accessed by the students when they want it rather than delivered beforehand. We created a Help tool that lets students get information on any active items on the screen; but only when they decide they need extra information.

There were, of course, many other factors influencing our design decisions. As always, two of the most important were money and time: both limited our options in terms of how much we could do and how we could do it. An early plan, for instance, to have an unlockable "bonus" module had to be dropped due to time constraints, and the fully functional search engine simulator had to be narrowed significantly in scope. We were also concerned with making the tutorial appropriate to students' cognitive development: because the age range – from as young as eight to as old as thirteen – covered so much cognitive growth, we knew we had to have two different age levels in the game. This was most important in the authentication module, where the older students analyze Web sites on a much more complex and subtle level. Older students also face more sophisticated tasks in other modules, such as being a witness to cyber-bullying instead of a victim.

What makes a successful educational game?

Henry Jenkins (2007), writing about successful educational games (or "serious games," a term many in the field prefer), identifies several characteristics they all have in common. First, they are made to fit specific learning contexts; in other words, they teach strong, specific strategies rather than weak, general ones. We made *Passport to the Internet* as specific as possible, identifying at the beginning of the design process the key skills we wanted students to learn and making the game as close as possible to the real-world context in which those skills would be used. Second, successful educational games supplement classroom teaching rather than replace it. Although *Passport to the Internet* can be played on its own, we created a comprehensive Teacher's Guide that allows educators to make the game part of a larger lesson series, with resources and activities from which teachers could pick and choose.

Jenkins' third characteristic of a successful serious game is its use of play as a learning strategy. We made each of the modules competitive (in addition to 'pass' and 'fail' each has a possible score of "best," bestowing bragging rights on those students who do especially well) while keeping the consequences of failure low to encourage experimentation. Fourth on his list is that every element of the game design is meaningful, so that users spend their time learning the content and not the interface. To achieve this we made the interface both simple and as near as possible to

environments with which students will already be familiar. We also provided a Help tool which gives both text and audio instructions when needed.

Fifth, Jenkins notes that successful serious games are social, rather than individual. Although time and budget constraints prevented us from creating a multiplayer version of *Passport to the Internet*, we've used the Teacher's Guide to provide opportunities for students to compare their experiences and share what they have learned. Finally, Jenkins observes that for any game to be successful it must be fun. We made the learning activities as entertaining and involved as possible—creating a social networking profile, carrying on a conversation with an online friend—to make sure that going through *Passport to the Internet* always felt like playing a game.

The landscape is littered with educational games that have failed for a variety of reasons: those that were insufficiently entertaining, those that had too little educational value, those where the match between the game and the content was too distant and arbitrary, and those where there simply wasn't enough time and money to make it work. Every designer has compromised on one or more of these, and we are no exception. We believe, though, that by being mindful of these concerns we have made *Passport to the Internet* a rich and powerful tool for teaching Internet literacy skills.

Passport to the Internet is available through a licensing arrangement as a stand-alone resource or as part of the MNet's professional development program *Web Awareness Workshop Series*. A video overview can be seen at:

http://www.media-awareness.ca/english/catalogue/products/descriptions/passport_preview.cfm.

Passport to the Internet partners are: Inukshuk Wireless Learning Plan Fund, TELUS, Elementary Teachers' Federation of Ontario, Toronto Catholic District School Board, London Public Library, and Nortel LearnIT.

About the Author



Matthew Johnson is a Media Education Specialist with Media Awareness Network, Matthew creates resources for educators, parents and community groups. He is the designer of *Passport to the Internet*, MNet's comprehensive Internet literacy tutorial for Grades 4-8. Matthew also writes the Talk Media blog, one of the most popular sections of the MNet Web site, where he has written on a wide variety of subjects, including a six-part series on the history and future of Web 2.0 He has given presentations and interviews to parents, school, community and industry groups on topics such as the effect of media violence on children, video game addiction, alcohol advertising, children's use of new media and the moral dimensions of computer games. Matthew is an educator with nearly ten years' experience teaching media education, film-making, English and special education among other subjects. His experience also includes award-winning work as a writer of prose, plays, radio and television scripts

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Appendix A: Current Game Screenshots

Cats Dream

The screenshot displays a game interface for 'Cats Dream'. On the left, a sidebar titled 'Do cats dream?' contains a list of search terms: Cats, Bed, Dream, Sleep, +Cats, +Bed, +Dream, +Sleep, -Cats, -Bed, -Dream, and -Sleep. The 'Cats' and 'Bed' terms are selected, resulting in the search query '+sleep > "cats dream" > -bed' shown in the search bar. The search results page shows three results: 'Do cats dream?' (124k), 'A guide to your cat's dreams' (114k), and 'My Cat Dreams' (95k). The interface includes a 'Passport to the Internet' logo, a 'Return to train station lobby' button, a 'Score' field, and a help icon. The browser address bar shows 'http://www.study-space.ca'.

Definition: Brief Instructions...
Lorem ipsum dolor sit amet,
consetetur am erat, sed diam Brief,
am erat, sed diam a diam Brief.

Study Space: Step 1 Study Space: Step 2

http://www.study-space.ca

Study Space Canada +sleep "cats dream" -bed Search

Search results: 1-3

Do cats dream?
Scientists believe that cats, like all other mammals, have periods of sleep where... [www.name.com](#) - 124k

A guide to your cat's dreams
Ever wonder what your cat is dreaming? This book will help you understand... [www.name.com](#) - 114k

My Cat Dreams
I'm sure that my cat dreams. When I see him curled up with his nose twitching... [www.name.com](#) - 95k

1-2-3 Try Again


Passport to the Internet

Return to train station lobby


Score ?

Instant Pigeon

? Definition: Brief Instructions...
Lorem ipsum dolor sit amet,
consetetur am erat, sed diam Brief,
am erat, sed diam a diam Brief.



RU4reel



User

A) You say: "OK."

B) You say: "I don't think I should."

Instant Pigeon


RU4reel: Did U get the new tracks from the site
[User]: yea ooo! I love "Furious George"
RU4reel: Have U heard the live version they did in London?
[User]: no is it on the site?
RU4reel: (shakes head) It's from the record they did on their last tour.
[User]: What's it called?
RU4reel: "Monkey Mayhem."
[User]: <g>
RU4reel: U can buy it from the web site.
[User]: No credit card 😞
RU4reel: Why don't I order the CD for you? I just need your address and phone number.

Answer



Buddy List

- RU4reel
- NEBuddy
- RedFlag11
- Targ8
- NEBuddy

Passport to the Internet

 [Return to train station lobby](#)

Score

My Face

The image shows a web browser window displaying a profile page titled "My Face". The browser's address bar shows the URL "http://www.myface.ca". The page has a green and black theme. On the left, there is a "Photos" section with a "Return to menu" link and five photo thumbnails: a person playing soccer, a cat, a couple, a person in a skull mask, and a person sticking their tongue out. Below this is a "Passport to the Internet" logo and a "Return to train station lobby" button. The main profile area includes a "my FACE" logo, a "Profile page" button, and a "Privacy settings page" button. The profile itself features a cartoon avatar of a man and several form fields: "Name", "Address", "Phone number" (with a "number" label), "Email address", and "Date of birth" (with "Day", "Month", and "Year" sub-fields). Below these are sections for "Where do you work/go to school?", "Relationship status", "Activities", and "Networks", each with an "Answer" input field. To the right of these sections is a "Photos" area with four placeholder icons (question marks). A "Validate" button is located at the bottom right of the profile form. At the bottom of the browser window, there is a "Score" field with a question mark icon and two pink arrow icons.