ONLINE VIRTUAL WORLDS: APPLICATIONS AND AVATARS IN A USER-GENERATED MEDIUM

HEARING

BEFORE THE

SUBCOMMITTEE ON TELECOMMUNICATIONS AND THE INTERNET

OF THE

COMMITTEE ON ENERGY AND COMMERCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

April 1, 2008

Serial No. 110–102

Printed for the use of the Committee on Energy and Commerce
energycommerce.house.gov

U.S. GOVERNMENT PRINTING OFFICE
50–918 PDF WASHINGTON : 2008

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON ENERGY AND COMMERCE

JOHN D. DINGELL, Michigan, *Chairman*

HENRY A. WAXMAN, California
EDWARD J. MARKEY, Massachusetts
RICK BOUCHER, Virginia
EDOLPHUS TOWNS, New York
FRANK PALLONE, JR., New Jersey
BART GORDON, Tennessee
BOBBY L. RUSH, Illinois
ANNA G. ESHOO, California
BART STUPAK, Michigan
ELIOT L. ENGEL, New York
ALBERT R. WYNN, Maryland
GENE GREEN, Texas
DIANA DEGETTE, Colorado
Vice Chairman
LOIS CAPPS, California
MIKE DOYLE, Pennsylvania
JANE HARMAN, California
TOM ALLEN, Maine
JAN SCHAKOWSKY, Illinois
HILDA L. SOLIS, California
CHARLES A. GONZALEZ, Texas
JAY INSLEE, Washington
TAMMY BALDWIN, Wisconsin
MIKE ROSS, Arkansas
DARLENE HOOLEY, Oregon
ANTHONY D. WEINER, New York
JIM MATHESON, Utah
G.K. BUTTERFIELD, North Carolina
CHARLIE MELANCON, Louisiana
JOHN BARROW, Georgia
BARON P. HILL, Indiana

JOE BARTON, Texas
Ranking Member
RALPH M. HALL, Texas
J. DENNIS HASTERT, Illinois
FRED UPTON, Michigan
CLIFF STEARNS, Florida
NATHAN DEAL, Georgia
ED WHITFIELD, Kentucky
BARBARA CUBIN, Wyoming
JOHN SHIMKUS, Illinois
HEATHER WILSON, New Mexico
JOHN B. SHADEGG, Arizona
CHARLES W. "CHIP" PICKERING, Mississippi
VITO FOSSELLA, New York
STEVE BUYER, Indiana
GEORGE RADANOVICH, California
JOSEPH R. PITTS, Pennsylvania
MARY BONO, California
GREG WALDEN, Oregon
LEE TERRY, Nebraska
MIKE FERGUSON, New Jersey
MIKE ROGERS, Michigan
SUE WILKINS MYRICK, North Carolina
JOHN SULLIVAN, Oklahoma
TIM MURPHY, Pennsylvania
MICHAEL C. BURGESS, Texas
MARSHA BLACKBURN, Tennessee

PROFESSIONAL STAFF

DENNIS B. FITZGIBBONS, *Chief of Staff*
GREGG A. ROTHSCHILD, *Chief Counsel*
SHARON E. DAVIS, *Chief Clerk*
DAVID L. CAVICKE, *Minority Staff Director*

SUBCOMMITTEE ON TELECOMMUNICATIONS AND THE INTERNET

EDWARD J. MARKEY, Massachusetts, *Chairman*

MIKE DOYLE, Pennsylvania
Vice Chairman
JANE HARMAN, California
CHARLES A. GONZALEZ, Texas
JAY INSLEE, Washington
BARON P. HILL, Indiana
RICK BOUCHER, Virginia
EDOLPHUS TOWNS, New York
FRANK PALLONE, JR., New Jersey
BART GORDON, Tennessee
BOBBY L. RUSH, Illinois
ANNA G. ESHOO, California
BART STUPAK, Michigan
ELIOT L. ENGEL, New York
GENE GREEN, Texas
LOIS CAPPS, California
HILDA L. SOLIS, California
JOHN D. DINGELL, Michigan (ex officio)

FRED UPTON, Michigan
Ranking Member
J. DENNIS HASTERT, Illinois
CLIFF STEARNS, Florida
NATHAN DEAL, Georgia
BARBARA CUBIN, Wyoming
JOHN SHIMKUS, Illinois
HEATHER WILSON, New Mexico
CHARLES W. "CHIP" PICKERING, Mississippi
VITO FOSELLA, New York
GEORGE RADANOVICH, California
MARY BONO, California
GREG WALDEN, Oregon
LEE TERRY, Nebraska
MIKE FERGUSON, New Jersey
JOE BARTON, Texas (ex officio)

CONTENTS

ONLINE VIRTUAL WORLDS: APPLICATIONS AND AVATARS IN A USER-GENERATED MEDIUM

TUESDAY, APRIL 1, 2008

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON TELECOMMUNICATIONS
AND THE INTERNET,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

235U

The subcommittee met, pursuant to call, at 9:35 a.m., in room 2123 of the Rayburn House Office Building, Hon. Edward J. Markey (chairman of the subcommittee) presiding.

Members present: Representatives Markey, Doyle, Harman, Inslee, Boucher, Eshoo, Stupak, Green, Stearns, Shimkus and Wilson.

Staff present: Amy Levine, Tim Powderly, Mark Seifert, Maureen Flood, Colin Crowell, David Vogel, Philip Murphy, Neil Fried, and Garrett Golding.

OPENING STATEMENT OF HON. EDWARD J. MARKEY, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF MASSACHUSETTS

Mr. MARKEY. The avatar will gavel the hearing to order. The subcommittee will come to order.

This is going to be, I think, one of the most fascinating hearings that we have ever had, and we thank all of you for coming and participating, and this is actually going to be the first simulcast of a congressional hearing in a virtual world. A recreation of this committee hearing room has been developed in Second Life, and my avatar is there as well in the virtual chairman's seat. My avatar actually looks like he has been working out, and that's one of the beauties of Second Life.

There are also several other avatars who have been invited to watch today's hearing from Second Life. In particular, I would like to welcome an avatar we have invited named Wild Cunningham, which was created by an inspirational group of individuals with cerebral palsy at an adult daycare center in Dorchester, Massachusetts. They are using their avatars to run, to fly, and to communicate with people in a whole new way. This is a prime example of how virtual worlds can empower and animate the lives of individuals with disabilities through the use of broadband technologies.

Mitch Kapor, founder of Lotus in Massachusetts and a transplant out to Silicon Valley and to Second Life, is also present with

his avatar in the hearing room. We have also invited the avatars of several journalists, online advocates, and academics, as well as the avatars of several Federal Government representatives from NOAA, the National Oceanic and Atmospheric Administration, who have built an incredible locale in Second Life where individuals can watch the impacts of global weather conditions, as well as fly into the eye of a virtual hurricane.

In fact, virtual worlds often permit people to do things in model conditions that would be difficult to do in real life. For example, emergency first responders can train for scenarios that are difficult to stage in real life. Responses to things like natural disasters or a flu pandemic can be practiced and analyzed by professionals in this virtual medium. In addition, the American Cancer Society has raised tens of thousands of dollars in charitable contributions in Second Life and is quite active in the medium. Colleges and universities around the country are also presently harnessing the power of this new medium for education, experimentation, cultural exchange, and fostering understanding. Virtual worlds are at the cutting edge of so-called Web 2.0 applications and services, which enable users to generate the content of this realm such as with YouTube and Flickr and Facebook. Virtual worlds can also support business operations and commercial applications from real estate sales to business conferences, product marketing, music sales, and the general buying of goods and services. IBM, which is testifying today, has been an early and active colonizer of this electronic frontier.

Today's hearing has been designed primarily to be educational. In time, virtual worlds will become ever more commonplace, and millions of Americans will inhabit such worlds for parts of their day for communications, for business, for education, for healthcare, for cultural interest. As that occurs, policy issues will inevitably arise that mirror the issues that confront policymakers in the real world: consumer protection, personal privacy, intellectual property protection, banking issues, online gambling, or child protection concerns. Policymakers will have to continue to monitor these issues to ensure adequate consumer protection as virtual worlds continue to evolve and to grow. However, online virtual worlds, as represented by Second Life or Zwinky or there.com, are at their best vehicles for understanding across borders and for building communities. They can empower individuals, companies, and professionals with the ability to visualize and conceptualize not only what is present, but also what is possible. To this extent, today's hearing is both a glimpse into the future and also a window into the current reality for millions of people across the world.

As the subcommittee delves into this first educational hearing about virtual worlds, it is important to keep in mind that if we want to foster the best of what this medium has to offer, we must consider the policies that will be conducive to such growth. These include upgrading our broadband infrastructure and speed, fostering openness and innovation in our Internet policies, and ensuring that we bridge digital divides in our country so that all Americans can benefit.

I want to thank our witnesses for their willingness to share their experience with us this morning and look forward to their testi-

mony. I would also like to thank the staff who have helped to pull this together today: Sharon Davis, Carla Hultberg, Phil Murphy, David Vogel, as well as Sue Singer from Second Life. All of them worked very hard over the last 5 or 6 days to put together today's exhibition.

That concludes the opening statement of the chairman.

I now turn to recognize the ranking member of the Subcommittee on Telecommunications, the gentleman from Florida, Mr. Stearns.

OPENING STATEMENT OF HON. CLIFF STEARNS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF FLORIDA

Mr. STEARNS. Thank you, Mr. Chairman. Let me compliment you on this hearing. I think it is an exciting time, and I also feel this, being the first hearing on virtual worlds, is a great event, and I compliment you on doing this, and I compliment Mr. Rosedale for the development here, and I see that we do have an avatar Mr. Markey there, and I was looking at the details, and obviously he looks like he is a bit younger, and he probably appreciates that, having come off a little basketball injury, and it looks like he is whole there.

The possibilities and the applications for what Second Life is doing with online virtual worlds are unlimited, probably only limited by the imagination and creativity of its employees. With the advent of higher resolution and high definition, the avatars that we have that we show for people here today are graphically worked out through artistic sketches in attempts to get the likeness. Obviously in the future these avatars could become photo or exact replicas in terms of viewing and a video representation that would look, walk, and act just like the real thing, and I think that is probably in the very near future. Advances in technology will lead to better graphics, easier to use and more innovative applications, as we see now in the high-definition digital cameras. We see it obviously in the cartoons and the comic book types of movies.

It is going to be a highly competitive world. We just want to make sure it is not highly regulated. The rapid development of text-based e-mail, today's audio- and video-rich worldwide web, we want to continue to have that. The unprecedented growth investment in broadband network services and applications is now leading to what some believe is the future of the Internet: virtual Web-based communities such as Second Life, in which users interact with each other through graphical representation of themselves.

This hearing obviously will explore some of the unique things about Second Life's users, what they are doing with the platform, as well as how Linden Lab, the company behind Second Life, is dealing with some of the challenges, and perhaps there are some challenges that we should talk about, their enabling unique and innovative ways to conduct entertainment, commerce, research, education, and political discourse. Mr. Markey was able to go to Bali on this virtual world and give a presentation. I think that was commendable the way you did it, and I thought it was very interesting. You can use Second Life as a storefront for real-world businesses or by selling virtual goods and services for use within Second Life, and you can start selling clothing, furniture and even buildings. Chevrolet now, I understand, owns an island where car enthusiasts

may converse with GM mechanics, designers and engineers to gain information on the repair of their automobiles, perhaps learning how to get better performance out of their cars. IBM employees worldwide use Second Life as an advanced video conferencing system for collaborative projects. This is all good. According to the Wall Street Journal, Second Life users spent a reported $64 million in 2006, and analysts estimate that Second Life 2007 GDP will be between $500 and $600 million.

A recent survey of 30,000 gamers found that nearly 40 percent of men and 53 percent of women who played online games said that their virtual friends were equal to or better than their real-life friends, so that is a concern here. Furthermore, more than a quarter of gamers said the emotional highlights of the past week occurred in the computer world.

Second Life has a great potential obviously, but we must remain vigilant, especially when it comes to criminal activity online, and these online virtual communities enable some of the most egregious social behaviors, social ills that we witnessed in the Internet. We could see it on Second Life. Child pornography is another one, as well as fraud. Sexual predators and con men have found their way into the Internet. They will find their way into the virtual reality, too. But like any business, virtual or real, it appears that Second Life must endure and must protect the safety of its users and be flexible in its platform so it can flourish at the same time without overregulation. So far, Second Life appears to be doing just that, and I commend them for that.

I will close, Mr. Chairman, by offering a suggestion that if somehow, some way you, as distinguished chairman, find the virtual world so enjoyable that you wish to remain in it for a while, I will be glad to ease your conscience here and take some of your colleagues with you, and I will be glad to run the subcommittee in your absence. With that, Mr. Chairman, I yield back.

Mr. MARKEY. I thank the gentleman.

I will now turn to recognize the gentlelady from California, Ms. Harman.

OPENING STATEMENT OF HON. JANE HARMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Ms. HARMAN. Thank you, Mr. Chairman.

For the record, my Web site has had a virtual office on it for years as a way to lead constituents around it. Some might also think of Congress as a virtual world. Many think we have little connection to the real world. We watch floor hearings and floor debates on flat screens or computers in the privacy of our offices. We fly into and out of town so quickly that we might as well send avatars to the Floor to vote in our stead. In fact, I even know an officeholder in my district along the beach in Los Angeles who conducts his office on the beach using a laptop. It sounds tempting, doesn't it?

But kidding aside, online virtual worlds, as you have just said and the ranking member has just said, play a valuable role. Second Life can provide language training to our foreign service officers and an open platform for e-commerce and innovation of new Inter-

net applications and many other things that we cannot even imagine yet and that I am sure our witnesses will imagine for us.

But as the ranking member said, there is also a downside. He was talking about crime. I would just like to mention terrorism. Press reports suggest that Islamic militants are using programs like Second Life to transfer money, build online communities and win new recruits. I do not think this should cause us to advocate censorship. I do not advocate censorship, but I do suggest that a clear-eyed understanding of the potential of virtual worlds is essential to helping us fight the newest trends in terrorism.

I would like to thank, Mr. Chairman, your avatar for holding this hearing. I actually suspect that the real reason we are here is so that you can get some pointers on how to get past the seventh level of the World of Warcraft, but I do think you need to know that chairing this hearing is only worth two experience points.

I yield back.

Mr. MARKEY. The gentlelady's time is expired.

The chair recognizes the gentleman from Illinois, Mr. Shimkus.

OPENING STATEMENT OF HON. JOHN SHIMKUS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. SHIMKUS. Thank you, Mr. Chairman. I will be brief. My second son just turned 13, so I have two teenagers now, and of course, they play a virtual reality game called RuneScape, with which they communicate with their friends. They both go online at the same time and kill dragons and get money and do whatever they do in that area. The other thing is an avatar, it is either a Hindu or a Buddhist name for a god, I don't know if you knew that, which always gives me some concern about virtual reality and how they are nice, but they do portray things that aren't real and I don't think anyone perceives as gods. Well, maybe some people do up here in Washington.

With that, I look forward to this hearing. I am going to learn a lot. I don't delve into this arena, so I thank you, Mr. Chairman.

Mr. MARKEY. I thank you, but I think only lobbyists see us as gods. I think the rest of the world has a clearer perception of who we are.

Let me turn and recognize the gentleman from Virginia, Mr. Boucher.

Mr. BOUCHER. No statement.

Mr. MARKEY. The chair recognizes the gentlelady from Silicon Valley, Ms. Eshoo.

OPENING STATEMENT OF HON. ANNA G. ESHOO, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Ms. ESHOO. Thank you, Mr. Chairman, for holding another hearing on emerging technologies, and a warm welcome to all of the panelists, certainly Mr. Rosedale from Linden Lab. I am proud that they have operations in my congressional district and our constituent company.

I can't help but think of the phrase "get a life," and now we have Second Life, and while some might think of it as a little peculiar, it wasn't that long ago that social networking was outside the

mainstream, and it is very, very quickly becoming the mainstream. It is a vital way for the major presidential candidates to reach out to voters directly. Several Members have already mentioned so many of its manifestations, but what I think is so exciting about it is that the possibilities seem to be endless. It is the transformative nature of the technology that allows for individuals to connect with each other in new and creative ways. Universities have created virtual environments for instruction and new ways for students to collaborate. It is a very important use of it. And companies use Second Life to bring distant employees together on projects, and we have already heard that some Members of Congress have also created virtual town hall meetings.

So there are many, many ways to make use of this, and Mr. Boucher is here this morning. There was a memorial for the tragedy in his district that included the pictures and bios of many of the students and faculty who had lost their lives. They created a place where anyone could leave a candle, flowers, or express their sympathy. So I think that this technology really taps into human beings wanting to socially interact, so there are fun applications, there are serious ones, and I look forward to hearing a lot more about this.

As I said to Mr. Rosedale, I am going to have to excuse myself because we have an Intelligence Committee meeting at 10:00, but again, I welcome all of you. For those of you who are here for the first time, this is a real Markey hearing. He is always tapping into the future. So thank you to all of you.

Mr. MARKEY. Thank you. The gentlelady's time has expired.

The chair recognizes the gentleman from Michigan, Mr. Stupak.

OPENING STATEMENT OF HON. BART STUPAK, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. STUPAK. Well, thank you, Mr. Chairman. Today's hearing encompassing online virtual worlds promises to be an interesting one, as the use of these applications continues to grow. The number of computer users subscribing to online virtual world services is growing at a phenomenal rate and is predicted to surpass 50 million users in 2008. One such online application, Second Life, has had an impact in the education field. Over 60 schools and universities have set up virtual classrooms in Second Life. Professors are creating environments designed not only to teach their students more effectively, but also to teach students hundreds or sometimes thousands of miles away. The business sector is also starting to join this growing medium. Companies such as IBM, Mazda, Disney, GM, Major League Baseball, and others have opened up a virtual property on Second Life, sometimes even showcasing their newest products for consumer feedback.

Aside from all the positives of this growing medium, I do want to focus on an issue that is very important: how is the industry that is creating these applications ensuring that children are protected from potential dangers online? With my law enforcement background and my work on O & I, we find that in 2006 the Subcommittee on Oversight and Investigations held 9 days of public hearings on online child safety. Our focus was on Internet service providers and social networking sites. These online virtual worlds

are similar to social networking sites and even more interactive. So I am interested in learning from our witnesses about what steps they have taken to ensure that children are protected when they log into these virtual worlds. Nearly one in five children reported receiving a sexual solicitation over the Internet, and an estimated 8.2 million children in the United States from ages 3 through 17 years old log onto virtual worlds. The anonymity provided by the Internet to those that seek to exploit and harm children and the lightning pace at which they can change identities and elude law enforcement provides a significant policy challenge. Nonetheless, we need to do everything we can to protect children that use these programs.

There are also concerns about the addictive nature of these applications. The American Psychiatric Association has begun studying the effects of these virtual world applications to see if some users are becoming psychologically addicted.

I look forward to discussing my concerns with our witnesses and learning more about what the future holds with this growing medium.

Thank you, Mr. Chairman, and thank you to all of our witnesses.

Mr. MARKEY. I thank the gentleman, and now we recognize the gentleman from Texas, Mr. Green, for an opening statement.

OPENING STATEMENT OF HON. GENE GREEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. GREEN. Thank you, Mr. Chairman, and following my colleagues, I am glad you called this hearing, because I think maybe some of us, and you and I shared it before the hearing, that we played basketball together for many years. Some of us are getting much older. Maybe in our Second Life we will always make our 3-point shot and still run up and down the court like we did 20 years ago.

Online virtual worlds like Second Life are growing in popularity,and I am not active in it like some of the members of our subcommittee, and I look forward to the educational hearing we are having today, learning more about the numerous uses and applications for virtual space. From commerce, grant promotion to philanthropic educational purposes, individuals, companies and universities and other groups are finding innovative, useful ways to make use of virtual space. Several years ago there were articles about former Governor Mark Warner creating an avatar in Second Life, which was unheard of at the time. Today, dozens of elected officials are in Second Life or virtual worlds, and we see presidential campaigns using Second Life to hold events, and grassroots efforts in virtual space have exploded.

In the area of education, my alma mater, the University of Houston, created a design economics course that uses live modeling of business practices in Second Life, where designers can try their design and entrepreneurial skills against an entire market, rather than using simulation software. This provides a real-time simulation of real-time economy and customers, which makes a realistic and quick experience in running an entrepreneurial venture. Students are free to create content and learn business skills under the mentorship of architects and businesspeople, as well as successful

virtual shopkeepers and developers. As more people with different applied sciences join in a virtual space, the educational potential will broaden to apply to journalism, music, police work, law, and many more.

In closing, I would like to comment that none of these uses or applications would be possible without high-speed broadband service, and as this committee moves forward, we should continue to promote innovation by supporting broadband deployment and competition in the marketplace. Fast and affordable Internet access will benefit consumers, foster innovation, and promote innovative and forward-thinking companies like Linden Lab. I hope we can continue and encourage the competition we have seen in the broadband marketplace over the past several years, which will be greatly increased with the creation of a third and maybe even a fourth pipe for wireless broadband service for the near future.

Again, I thank you, Mr. Chairman, for holding the hearing. I yield back my time.

Mr. MARKEY. The gentleman's time is expired.

The chair recognizes the gentleman from Pennsylvania, Mr. Doyle.

OPENING STATEMENT OF HON. MIKE DOYLE, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF PENNSYLVANIA

Mr. DOYLE. Thank you, Mr. Chairman.

Mr. Chairman, I noticed that we are holding this hearing within Second Life. As you have mentioned, Second Life isn't the only online virtual world, and Mr. Chairman, you are not the only one with an avatar either. A more computer-savvy member of my staff made an avatar for me and my staff a few months ago, and hopefully we can put it up on the screen there for you to see. There is my staff and I.

Mr. Chairman, my point is, Members of Congress, we have a lot of lives. Not only do I sit on this subcommittee, but I also co-chair the Coalition on Autism Research and Education, better known as the Autism Caucus, and since tomorrow is World Autism Day, I feel it is important to highlight some uses of this technology. For example, autistics.org has created the Autistic Liberation Front. It is a platform where men and women with autism or Asperger's are able to find other people with autism and communicate more. Some of these people are what we might consider as uncommunicative, and we might have written them off and ignored their unique skills and abilities. For these people, Second Life has given them a voice in ways that other methods have failed. To that end, I would like to introduce this recent article from Wired magazine about people with autism and Asperger's and how their creative uses of the Internet are causing some researchers to rethink their conclusions about people with autism.

Mr. MARKEY. Without objection, it will be included in the record.

[The information appears at the conclusion of the hearing.]

Mr. DOYLE. Thank you. And just as important, Second Life and others like it are great examples of how the Internet is changing. Give people a connection and they find fascinating new ways to fill it. Peoples' tastes and interests are changing, and the Internet

changes with them. You know, Mr. Chairman, sites like Second Life raise interesting questions about net neutrality. Too often the conversation about it has been about how to manage scarce bandwidth. I think that conversation needs to be flipped on its head and instead the conversation needs to be about how we can obtain an abundance of bandwidth. People like our witnesses here will find new ways to come and use it, but only if America builds it and makes it available to everyone.

Thank you, Mr. Chairman. I yield back my time.

Mr. MARKEY. The gentleman's time is expired.

The chair recognizes the gentlelady from New Mexico, Ms. Wilson.

Ms. WILSON. I waive.

Mr. MARKEY. All time for opening statements has been completed, so we will turn to our first witness. That is Philip Rosedale, who is the founder of Linden Lab and creator of Second Life. He has extensive knowledge in the development and pioneering of streaming technology, having been the chief technology officer at Real Networks for 3 and a half years, as well as the entrepreneur-in-residence for Excel Partners, where he began his work that would lead to Second Life. We welcome you, Mr. Rosedale, and whenever you are ready, please begin.

STATEMENT OF PHILIP ROSEDALE, FOUNDER AND CHIEF EXECUTIVE OFFICER, LINDEN LAB

Mr. ROSEDALE. Thank you, Chairman Markey, Ranking Member Stearns, members of the subcommittee. We at Linden Lab very much appreciate the opportunity to come and talk to you, share with you our vision of how we think virtual worlds are fundamentally altering how both people and organizations can use the Internet, and I think more broadly, changing the nature of communication itself. It is certainly delightful to hear the depth of knowledge that everybody here has coming into this, and hopefully we can add something today.

Through Second Life, the Second Life Grid, we believe we are creating a part of the evolution of the Internet as a new platform with vast commercial, scientific, educational and social potential. We founded Linden Lab in 1999 to try and develop a unique form of shared 3D experience. When we launched Second Life in 2003, we had enough server space to represent about a 1-square-kilometer patch of land in the virtual world. We also had about 500 users of Second Life at that time. We welcomed our 100,000th user in January of 2006, and since then we have seen a great deal of phenomenal growth. Today, in the past month there have been about 900,000 people who have used Second Life, and at any time there are typically 50,000 to 60,000 people who are logged in together to the virtual world. Our servers today support nearly 390 square miles of virtual land, which is the equivalent of over six times the area of Washington, D.C.

So why have we seen this kind of explosive growth? We think the Second Life grid is essentially the next step in the fulfillment of what we all want to do or imagine ourselves being able to do with the Internet, allowing us as people to both create and consume content and also interact with each other in a 3D environment. As we

have discussed, the potential for education, entertainment, other types of interaction in a 3D environment that is filled with other people, is far greater than in the flat and isolated two-dimensional world of the Web today.

So while Second Life began initially in its use with playful experimentation and self-expression, today we are seeing a very vibrant mix of in-world businesses, real-world brick-and-mortar brands, educators, scientists, and curious and creative individuals. These groups are creating content. They are engaging in commerce, and they are mixing with each other easily across what might otherwise be real-life gaps, gaps that are caused by geography, physical geography, by language, by culture, or even just by lack of information.

So to help you understand what Second Life users are creating, we have prepared a short video especially for this hearing. We will share with you some typical Second Life stories, hopefully give you a glimpse of the many ways people are using Second Life, and you may even see a familiar face in here, so let's watch it.

[Video shown.]

Mr. ROSEDALE. Thanks. As you have hopefully seen, there are a lot of new and very innovative things that are happening on the Second Life Grid.

So, on a broader scale, why does this all matter? We believe virtual worlds, particularly Second Life, hold great promise for America, for our economic development, for our ability to compete globally, and most fundamentally, virtual worlds mark a significant leap forward in how we are able to communicate and work together over geographic distances. As you have seen in the video, in virtual worlds there is a sense of geographic place and personal presence, even when users are miles or continents apart. In Second Life, you can see the other person. You can verbally speak with him. You can also chat or instant-message with him. So you are occupying a multi-tiered communications platform with dimensions that do not currently exist with e-mail, telephone conference calling, or even the Web. This vastly expands our ability to collaborate over a distance. Large groups can hold conferences, they can engage in language training, as mentioned. They can design blueprints, plans or computer code as if they were in the same room together. In a virtual atmosphere, even people who haven't met each other can rapidly establish rapport and trust. This is one reason why large companies are effectively using Second Life across distributed communities of employees. They are taking advantage of the ability to transfer and view information basically immediately in Second Life along with the reduced production and infrastructure costs and very low barriers to entry inherent in this technology.

By making this kind of environment, this immersive environment, widely accessible, virtual worlds we think are poised to do what the telephone, the Internet and e-mail all did, which is to reduce communications costs and create new and faster ways to build and collaborate and thus increase personal productivity. These increases in productivity tend to occur exponentially, so we think it is vital to America's growth that we lead the charge and continue to develop the expertise and framework to master this new technology.

Mr. MARKEY. If you could summarize, Mr. Rosedale?

Mr. ROSEDALE. Let me just say in summary, Second Life, beyond being, as we have seen, a place to create and experience content, it is also a place that is creating businesses for some 50,000 people today, making money there, something that I as an entrepreneur am personally proud of, and in summary, I think that we as a nation have an ability to continue the technological leadership and development that will make the success of Second Life and virtual worlds broadly possible. Thank you.

[The prepared statement of Mr. Rosedale follows:]

STATEMENT OF PHILIP ROSEDALE

Chairman Markey, Ranking Member Stearns, and Members of the Subcommittee, we at Linden Lab very much appreciate this opportunity to share with you our vision of how virtual worlds are altering how people and organizations use the Internet and fundamentally changing the nature of communication itself. Through the Second Life Grid, we believe we are creating an evolutionary Internet platform with vast commercial, scientific, educational, and social potential.

We founded Linden Lab in 1999 to develop a unique form of shared 3D entertainment. When we launched Second Life, in late 2003, we had server space representing a 1-square-kilometer patch of "land" and about 500 residents. We welcomed our 100,000th resident in January 2006. Since then, we have experienced phenomenal growth. Today, we have approximately six million unique registered users, roughly 50,000–60,000 of whom are online or "in-world" at any one time and roughly 900,000 of whom have been in-world during the last 30 days. Our users exchange approximately $850,000 worth of "virtual currency" per day on our platform. Our servers support nearly 390 square miles of "land," or the "virtual" equivalent of over six times the area of Washington, D.C.

Why have we seen such explosive growth? The Second Life Grid is the next step in the fulfillment of the Internet's promise, where people create and consume content and also interact with each other in a 3D environment. The potential for commerce, education, entertainment, and other interaction in a 3D environment filled with other people is far greater than in the flat and isolated 2-dimensional world of the World Wide Web.

And so, while Second Life began with a large "game-play" element, today we see a vibrant mix of in-world businesses, real-world "brick and mortar" brands, educators, scientists, and curious and creative individuals. These groups create, engage in commerce, and mix with one another across what might otherwise be real gaps—caused by geography, culture, telecommunications, or lack of information.

To help you understand what Second Life users are creating, we have prepared a short video, especially for this hearing. We will share with you typical Second Life stories and applications so that you can get a glimpse of the many ways in which people throughout the world are using Second Life to broaden their reach. You'll even see a familiar face or two.

[video shown, and submitted separately]

As you have hopefully seen, a lot of new and very innovative things are occurring "in-world."

But on a broader scale, why does this matter? We believe it matters because virtual worlds, and particularly Second Life, hold great promise for America, for our economic development, and for our ability to compete globally. Most fundamentally, virtual worlds mark a leap forward in how we can communicate and work together over geographic distances. As you have seen in the video, in virtual worlds there is a sense of geographic "place" and personal "presence," even when users are miles or continents apart. In Second Life, you can "see" the other person, verbally speak with him, as well as chat with or "instant message" him. You occupy a multi-tiered communications platform with dimensions that do not exist with e-mail, telephone calls, conference calling, or other platforms.

This vastly expands our ability to collaborate over distance: large (or small) groups can hold conferences; view evidence, charts and other content; do language training; and design code, blueprints, and plans as if they were in the same room. Moreover, in a "virtual" atmosphere, even persons who have never met can establish rapport and trust with one another. This is one reason why large companies are effectively using Second Life across distributed communities of employees. Other rea-

sons are the ability to transfer and view information immediately in Second Life, along with low production and infrastructure costs and barriers to entry.

By making this type of "immersive" environment widely accessible, virtual worlds are poised to do what the telephone, the Internet, and e-mail did—reduce communications costs and create new and faster ways to produce, and thus increase, productivity. These increases in productivity tend to occur exponentially, so it is vital to America's growth that we lead the charge and develop the expertise and framework to master this technology.

There is another aspect of the Second Life Grid of which I, as a lifelong entrepreneur, am particularly proud. As of today, more than 50,000 users are "net gainers" on the platform, and this number is rapidly growing. In other words, these users are successfully creating goods or services in Second Life and making a profit. Second Life has provided thousands of people with a way to supplement their incomes, through no significant expenditure but their own time and imagination.

This demographic of creators is diverse—more than 40 percent of active user time "in-world" is spent by women and an equal percentage by persons over 40—not a stereotypical "gamer" profile. They range from semi-employed artists who design "virtual" offices to stay-at-home soccer moms and grandmothers who design clothing, furniture, and new applications. And since more than 70 percent of our users are outside of the United States, Second Life provides an opportunity—if we continue to master this technology—for America to become a "net exporter" of these services.

I am proud of and inspired by all that the Second Life Grid is making possible, for all of these individuals and businesses, and I believe that our nation's technological leadership and standard of living ultimately will depend on the success of Second Life and other virtual worlds. We want to work with you to ensure we get it right.

IMPORTANT APPLICATIONS OF OUR TECHNOLOGY

People in Second Life have created over 1 billion in-world "objects," occupying total storage space of about 100 terabytes. Most of these objects derive their value from their intellectual or artistic appeal, or sheer utility. Second Life is as diverse as the real world in terms of types of activities it offers—maybe even more so.

Political Outreach and Community. Virtual worlds offer enhanced opportunities for public participation in government, including new ways for Members of Congress to connect with their own constituents or with groups located around the world. As you saw in the clip of Chairman Markey's address in Virtual Bali, virtual worlds provide a great opportunity for expanded political discourse, in ways not possible—or at least not cost-effective—in the physical world.

Public luminaries such as Judge Richard Posner and former Speaker Newt Gingrich have held successful (and widely discussed) events in Second Life. The City of Boston has a Second Life prototype in the works, to extend community involvement and promote outreach. At the neighborhood level, residents of Queens have used Second Life to design their community garden.

We are particularly proud that this very hearing is being streamed live into a 3D model of this hearing room, with in-world residents watching from their seats in this virtual environment. You may even see some spontaneous text chat emerge from the gallery.

Education and the Arts. A wide range of academic and educational organizations use our platform, for research and modeling, distance learning and real-time collaboration. We offer a program called Campus: Second Life, which provides semester-long grants of "land" to educators who want to teach in the virtual world. As of today, there are more than 400 universities in Second Life and more than 4,500 teachers involved in Second Life.

Health Care. Hospitals, doctors, and medical researchers are sharing information, designing new treatment options, and collaborating on medical research using Second Life. The Center for Brain Health at the University of Texas at Dallas, for instance, is using Second Life in treating autism. Through virtual therapy sessions, clinicians help patients develop cognitive and socialization skills and prepare them for practical tasks like job interviews. And many emergency "first responders" are using Second Life to train for scenarios that are difficult to stage in the "real" world.

Recently, IBM opened its Virtual Healthcare Island, through which it will assess how information technology can transform health care delivery to meet patient needs. Earlier this year, Palomar Pomerado Health, which is opening a new state-of-the-art medical center in San Diego in 2011, opened a simulation of the real-life campus now under construction. "Virtual" visitors will help the "real" hospital test

new concepts for health care delivery, such as the use of RFID technology to ensure that patients en route to surgery arrive at the right place, on time.

eCommerce. Virtual worlds offer opportunities both for large corporations seeking to increase productivity and for individual entrepreneurs who can profit from virtual "micro-economies." (The average "virtual currency" transaction in Second Life is approximately one dollar—which might buy, for instance, new accessories or clothes for your "avatar" or admission to a museum or musical event.) Individuals profiting in Second Life from their own creativity range from young artists to retirees to semi-employed workers in non-technical fields—people who may never before have had an opportunity to use technical talents for profit. Second Life's "micro-entrepreneurs" also include many individuals who have physical disabilities that challenge their abilities in physical space, yet who thrive, create, and earn money in virtual space. Indeed, many persons with disabilities have launched new careers in-world and gained enormous fulfillment from their new, "virtual" activities.

Major companies such as IBM, Intel, and Cisco also are making wide and effective use of Second Life as a platform for corporate communication and information. They, and countless other companies, use our technology to unite employees scattered across the globe—for collaborative projects, business planning, and distributing their companies' corporate culture. And many brick and mortar companies, such as Pontiac, Coca Cola, Starwood and Adidas, have used Second Life effectively and innovatively for brand-building and marketing.

Public Diplomacy. Virtual worlds offer opportunities to connect people of different cultures, in ways not possible in the physical world. The USC Center on Public Diplomacy has created a Virtual World Project, for instance, to explore new ways of practicing public diplomacy. The Center has worked with the U.S. State Department, for example, to explore the possibilities that virtual worlds offer for hosting International Information Program initiatives, which can engage international audiences to create an environment more receptive to our national image abroad.

Because of their strong sense of presence, ability to foster trust across borders, and multi-layered communication platforms, virtual world technologies offer a way to reach whole populations across the globe—even across unfriendly borders—that might be resistant to establishing rapport or trust through other means. Virtual technologies could provide the "Voice of America" for the new diplomatic age.

POTENTIAL MISUSE OF VIRTUAL WORLDS

We believe that individuals within Second Life ought to have a considerable measure of creative and personal control over their own experience. And like any large platform, the sheer volume of in-world activity prevents Linden Lab from being able to police all in-world activities, at all times. That said, we take considerable steps to discourage and prevent illegal activity, and our users lend us a great deal of assistance in this endeavor.

Our policies prohibit illegal activities, both in general and specific forms. And unlike some online communities, we have the ability to track, retain, and investigate information related to potential crimes—and thus the ability to closely assist law enforcement. Perhaps most fascinating, because so many of our users are deeply invested in Second Life, whether for economic or other reasons, they act to protect their own environment much as real world residents do. For instance, they will report inappropriate material in public areas, obstreperous or intrusive "ad farms," suspected underage users, gambling, or other inappropriate activity. We in turn respond to these reports, if and when they arise, and suspend wrongdoers or report them to law enforcement.

Among the issues we have tackled head on are gambling, money laundering, child safety, and so-called virtual "banking." In addition, we are working hard to make sure that we address the concerns of parents about the use of Teen Second Life.

Gambling. Because there are a variety of conflicting gambling laws around the world, we chose last year to ban games of chance in Second Life. Residents are not permitted to operate casinos taking "virtual currency" on games such as Baccarat, Blackjack, Keno, Roulette, Pachinko, Gow, Poker, and any other game, new or old, that relies on chance. This policy also prohibits sports betting. Our "G-team" actively searches for such activities, and where we discover gambling, we remove all related objects from the in-world environment. We take escalated measures against egregious or repeat offenders, including suspension from Second Life.

Money Laundering. We have a large team dedicated to dealing with fraud and abuse, and we have systems in place that make it extremely difficult to engage in money laundering. We also have sophisticated anti-fraud and fraud-tracking tools. Since we implemented them, our fraud and chargeback rates are approximately 0.3

percent—a small fraction of the online industry average of approximately 1.2 percent.

Financial activity on our platform is tracked and monitored. Users generally purchase "Linden Dollars" through a credit or debit card, or PayPal. Users who sell Linden Dollars on the LindeX "virtual currency" exchange can then receive payment for this "balance" (usually through PayPal) only upon passing through verifiers and fraud tools—designed to detect fraud markers (inconsistent activity, suspicious transaction patterns, inconsistent account information, etc.) or a lack of credible corresponding in-world activity. Moreover, as a micro-transaction platform, large transactions (e.g., in the thousands of dollars) clearly stand out. The result is that using the LindeX exchange as a money laundering or fraud conduit would be extremely difficult.

Teen Access/Internet Safety. Second Life's Adult Grid is just that: an adult environment. It is not intended for minors, and when discovered, minors are removed and banned. But we know teenagers are interested in virtual worlds, so in 2005 we created a separate secure environment for teen residents called Teen Second Life. We developed Teen Second Life for kids aged 13-17. With the exception of Linden Lab staff (who are available to help) and educators (who undergo a background check), no adults are permitted to interact with these users. We are committed to providing a safe environment for our teen residents. As part of this effort, we provide advice to parents on how to stay involved with their teens and help them, through the use of our online safety tips, to protect their identity and communicate safely with others while online.

In addition to these efforts, we have joined other leading technology companies as part of the Berkman Center's Internet Safety Technical Task Force. We have hired a former senior government Internet crime prosecutor to carry out these and other safety measures. Working with other leading technology companies, we collectively will focus our work on identifying effective online safety tools and technologies that can be used by companies across multiple platforms, to address Internet safety concerns.

CONCLUSION

We are excited about the possibilities that lie ahead. The fast pace of technological advancement allows for continued improvements upon ways in which individuals can stay connected. Imagine the potential that the World Wide Web held in 1994. What was once a novel concept, hobbled by clunky software and limited connectivity, is now ubiquitous. Most of us cannot imagine life without the Internet. It has become an extension of our lives. The Second Life Grid offers an even more advanced way to network with fellow human beings.

Through Second Life and other virtual worlds, the real world will become a better, more connected place.

Thank you.

Mr. MARKEY. Thank you, Mr. Rosedale, very much, and thank you for that incredible presentation, and I just want to stipulate right now so that everyone knows, the only resemblance between that avatar and me is the request that I made that because I am of Irish descent that they give me a green tie, and beyond that, any resemblance is completely coincidental.

Let me now turn to recognize Susan Tenby. She is the online community manager for TechSoup. TechSoup is a comprehensive Web-based resource covering all aspects of nonprofit technology and channeling over $50 million yearly of technology product philanthropy into the nonprofit sector. Susan plays a large role in the development of nonprofits in Second Life. We welcome you, Susan. Whenever you are ready, please begin.

STATEMENT OF SUSAN TENBY, SENIOR MANAGER, COMMUNITY DEVELOPMENT, TECHSOUP

Ms. TENBY. Good morning, Mr. Chairman and members of the committee. My name is Susan Tenby, and I am here as the senior manager of online community development at TechSoup to talk to

you about the potential of nonprofits in Second Life, and I am pleased to be here today. I have submitted my full statement to the committee to be made part of the permanent record, and my avatar name is Glitteractica Cookie.

So TechSoup helps nonprofits get and use technology to further their missions. We have distributed over a billion U.S. dollars to the sector and technology product donations. We have community articles about nonprofits and technology, and specifically my role right now is to talk about online community social networks and Second Life for nonprofits virtual worlds.

Social networks such as Facebook, YouTube, and MySpace are becoming the dominant force in shaping how society uses communications technology. Second Life is an example of a social network that combines the engagement of interactive tools with the richness of broadcasting. There is two-way interaction, user-created content, and international reach, and it is free to participate. Social networks such as Second Life have become an effective way to help nonprofits engage their communities, enlist new volunteers and donors and broaden their reach. Virtual worlds such as Second Life have forever revolutionized the way people and organizations connect, learn, and create with the element of fun. Identity exploration in the medium through the experience of character avatars allows people to empathize with communities that are different from their own.

A number of philanthropic foundations are actively investigating the potential of Second Life to help them and their grantees better fulfill their missions. Through their Foundations Only Island, the John D. and Catherine T. MacArthur Foundation is leading the exploration of virtual philanthropy and soon will be sharing opportunities to help the social benefit sector both online and in the virtual space. The Ford Foundation has also expressed interest in this work, as have smaller foundations and individual contributors and donors.

Second Life makes it easy to bring people together across the globe for no cost to the user to discuss issues such as climate change, human rights abuse, disability and other targeted communities. I am sure you all remember Congressman Markey's Second Life participation in the One Climate Bali conference. Our community of nonprofits, The Nonprofit Commons, often has what we refer to as mixed reality events; in fact, what you are seeing right here, feeding live audio and video both directions through the virtual world into the real world and back again. Nonprofits are already active and exploring virtual worlds in Second Life, and Second Life has emerged as the leading virtual world in the nonprofit sector. This tool allows you to capture audio, video, and text, chat communications and allows users to easily upload the media to the Web and share activities after they have occurred, offering a free and easy publishing system and an easy way to bring communications and archive all that happens in the virtual world on the traditional Web.

So a few examples of nonprofit activities in Second Life are the TheWallSL.com, which is an example of a virtual Vietnam Veterans Memorial, which allows people who do not have access to the real-life memorial to visit it and to check in and read more about

the people listed on the traditional Web. The disability community, as we mentioned earlier, is well represented, and Second Life gives them a venue to discuss and collaborate with others where they wouldn't previously have had access. In some instances, for example, people who are wheelchair-bound are given the opportunity to walk, run or even fly. It provides a safe environment for support and recovery services such as Alcoholics Anonymous and Narcotics Anonymous. The American Cancer Society's Virtual Relay for Life made a Second Life version of their race where they raised $118,000. They also have ongoing cancer support group meetings. It provides a rich educational experience that would not be possible in real life. For example, in Second Life you can walk through a human heart or take a spaceship up in space and explore. Organizations like Global Kids are providing youth with a participatory and creative way to learn about current and historical events.

Our goal with The Nonprofit Commons in Second Life is to play the role of the convener, to create a collaborative learning environment, a community of practice to help nonprofits meet with each other. We do this through a structure where we have built a community and offices. We have regular meetings in the virtual world, and we have created a seedbed for experimentation and a comfort zone and structure that we have provided. We are trying to create a program with other innovators in the space so nonprofits across the globe can take part in participatory learning and connect to the virtual donation connections and volunteers to benefit their real-life missions.

Thank you for the opportunity to appear, and I am ready to answer questions.

[The prepared statement of Ms. Tenby follows:]

Susan Tenby
Senior Manager, Community Development
Nonprofit Commons and TechSoup
susan@techsoup.org
(415) 633-9333
Second Life avatar: Glitteractica Cookie

The following paper describes the role, history, and expected impact of The Nonprofit Commons in Second Life, a project of TechSoup. It is submitted as additional background material in support of Susan Tenby's testimony before the US Congress, Subcommittee on the Telecommunications and the Internet on April 1, 2008.

****

An Introduction to The Nonprofit Commons in Second Life

Project Description

Nonprofits are continually looking for effective, low-cost ways to engage and serve their constituents, advocate for their causes, raise money, and run their organizations more efficiently. So, it is no surprise that they have started tapping into the community-building, outreach, and fundraising potential of newly emerging "virtual worlds." Numerous virtual worlds exist in the Web sphere, but Second Life (or "SL") has rapidly emerged as the leading virtual world for nonprofits around the world—frequently providing a platform for a wide range of nonprofit-hosted activities:

- A humanitarian aid worker returned from Sudan describing the plight of Sudanese refugees to an international audience.
- A fundraising gala and silent auction for cancer research attended by well-heeled patrons bidding on shimmering gowns.
- Regulars at a weekly Alcoholics Anonymous meeting sitting in a loose circle and helping each other through another day of sobriety.
- Teenagers creating sets, costumes, and lighting to shoot an educational video about child soldiers in Uganda.

These relatively routine nonprofit activities are occurring in a virtual world that exists without geographic restrictions and that can vastly increase each participant's ability to share their ideas and meaningfully connect with potential partners, mentors, volunteers, and funders.

The first and largest nonprofit-specific learning community in SL, The Nonprofit Commons, facilitates access to this technology and empowers even the smallest nonprofits to "virtually" operate at their fullest potential in SL. The group has grown into

a vibrant, cooperative community that offers free virtual office space for 71 nonprofits, weekly interactive meetings with an average of 50 attendees each, guided tutorials, and facilitated discussions about outreach, fundraising, activism, and volunteering in the virtual world. The Nonprofit Commons has already achieved broad appeal with interest from organizations from 59 countries and a social network that includes engaged members ranging from large international organizations such as the humanitarian group CARE, national-focused groups like America's Second Harvest, and community initiatives such as the Lower Eastside Girls Club of New York. The Nonprofit Commons also offers a listing of nonprofits in SL and a hub that allows one-click teleporting to many nonprofit headquarters throughout SL.

Linden Lab, the creator of SL, considers The Nonprofit Commons digital community to be the primary community of practice for nonprofits in SL and they feature a direct link to The Nonprofit Commons page. The Nonprofit Commons provides a welcoming and orienting presence to nonprofits in SL, the potential of which is just now being realized for the social benefit sector. As summarized by SL avatar, PCOSGurl Infinity from the Polycystic Ovary Syndrome, "It enhances a nonprofit organization's ability to connect, network, and provide service. The opportunities are limitless and the ability to impact the success of our real life organization is amazing." (For additional testimonials, please refer to the end of this paper.)

Project Objectives

The Nonprofit Commons increases the real-world impact of nonprofits by building on the potential of the SL digital platform to share and develop ideas and to foster connections across the nonprofit community. Through a supportive, interactive learning and relationship-building environment, nonprofits learn how to use SL to quickly and easily locate, create, and share resources and information, to network within and outside their communities, to enhance internal and external communications, and to engage their constituency more effectively.

Weekly meeting topics range from technical how-to demonstrations to capacity building tips to issue awareness-raising, as exemplified by this sampling of meeting topics:

- Best Practices for Nonprofits
- Beginners Building Class
- Fundraising Lessons from the American Cancer Society's SL Relay for Life
- Gone Gitmo (a demonstration of what life is like in Guantanamo Bay's Gitmo detention center and prison)
- OneWorld, OneClimate Virtual Bali Conference
- Second Life/Facebook Integration
- Techniques in In-World Audio-Streaming
- Using Emerging Technologies and Virtual Worlds for People with Disabilities

The Nonprofit Commons digital community is comprised of four interactive online sites:

1. Second Life TechSoup Group (http://groups.google.com/group/TechSoup-Second-Life). Managed through a Google Groups account, this site is home to more than 500 members who are interested in how virtual worlds, specifically SL, can assist the nonprofit sector. Members discuss issues pertaining to SL meetings, events, and the building and designing of SL tools.

2. The Nonprofit Commons islands in SL (office spaces and amphitheatre) (http://tiny.cc/QkgzM). The Nonprofit Commons in SL is the virtual world hub for nonprofit networking, information sharing, and structured events. Its amphitheatre is home to the weekly meetings discussed above, in which any SL resident can learn how nonprofits can use the SL platform to increase their real world impact. In addition, free virtual office space is available for up to 71 nonprofit groups. These virtual offices allow nonprofits to create their own presence in SL, promote their cause, and network with potential partners, volunteers, and funders. Currently, The Nonprofit Commons in SL is comprised of two generously donated sims (virtual "islands"). The first sim was donated by Anshe Chung Studios (www.anshechung.com) and the second sim was recently donated by Taking IT Global (www.takingitglobal.org), a nonprofit member of The Nonprofit Commons digital community. Both islands are managed by TechSoup and a group of volunteers with the goal of minimizing access barriers to SL for nonprofits.

3. NPSL Blog (www.nonprofitcommons.org). TechSoup launched the NPSL Blog in May 2006 to provide an additional venue for nonprofit founders, employees, volunteers, and friends interested in SL participation and collaboration. Through the NPSL Blog, TechSoup promotes nonprofit events in SL, records The Nonprofit Commons nonprofit activities, gathers and evaluates best practices for nonprofit SL-based fundraising, community-building, and furthering real-world organizational missions.

4. Nonprofits in Second Life Wiki (http://npsl.wikispaces.com). The Nonprofits in Second Life Wiki allows volunteers to upload and edit resource links, how-to tips, and tracking documents for volunteer roles and activities in support of The Nonprofit Commons. The Wiki provides documentation and other helpful information for The Nonprofit Commons tenants as well as any nonprofit that is interested in learning about SL best practices for social benefit organizations.

Geographical Context

The Nonprofit Commons digital community supports nonprofits who have real-world offices or operations throughout the world. A testament to the community's global reach, The Nonprofit Commons tenant organization list includes nonprofits from Australia, Bahrain, Belgium, Canada, France, India, Italy, Japan, Sri Lanka, the UK, and the USA.

The current list of nonprofits with virtual office space in The Nonprofit Commons illustrates the wide range of issues and target communities represented:

America's Second Harvest
AngelAID Foundation
Blossom International
Boomer Esiason Foundation
Breakthrough.tv
Bridges for Women
CARE USA
Center for Civic Education
Cheerful Givers
Child Rights and You
Community Voicemail
Crohn's and Colitis Foundation
Digital Campfires Foundation
Drug Policy Alliance
Equinox Documentaries, Inc.
Faith Foundation
Floaters
Games for Change
Given Gain Foundation
Giving Circles Network
Grants Managers Network
Great Strides
Herstartup
HUMANBE France
Idealist.org
Information Architecture Institute
International Rescue Committee
International Humanities Center
Johnson Center
Kiva
Life Learning Center
Mariners' Museum
Medical Emergency Relief International
Multiple Myeloma Research National Council
Neehan Historical Society
Non-Profit Global Network
NSW Animal Rescue
OPhoenix
Partners for Others
Peace Potential
SPCA Humane Society of Port George
Preferred Family Healthcare
Project Jason
Robert C. Maynard Institute for Journalism Education
RoSa Library
SGL Philanthropic Services
Small Health Office
Sri Lanka Foundation
Sustainable Harvest International
Taking IT Global
Transgender Resource Center
Virtual Ability
WMNF Public Radio
Women's Festival
Xigi
Yehoodi
Youth Venture

Project History

The Nonprofit Commons was developed and launched by TechSoup, an internationally recognized nonprofit leader in using digital media to build community across a global audience of nonprofit and nongovernmental organizations. In 2005, TechSoup Senior Manager, Online Community Development, Susan Tenby, began investigating the potential for nonprofits in SL. Noticing a lack of nonprofit participants, she led the 2006 launch of a TechSoup Group in SL. Clearly tapping an unmet need, several hundred people joined in the first few days (the group now totals nearly 500 members).

While Ms. Tenby was presenting her work at the Second Life Community Convention (SLCC) in 2006, her passion, knowledge, and ultimate vision for the project caught the attention of Guntram Graef, business partner of Anshe Chung, SL's first [US$] millionaire real estate baroness. In support of Ms. Tenby's efforts, Ms. Chung generously donated The Nonprofit Commons first sim, which became The Nonprofit Commons' initial office complex and amphitheatre. Within months, the 32 virtual offices available in this initial island became occupied and, soon after, there was a waiting list of over 20 additional nonprofits seeking virtual office space. Recently, one of The Nonprofit Commons member organizations, Taking IT Global, donated an additional sim to accommodate this demand. With this new sim, The Nonprofit Commons can now offer virtual office space for up to 71 nonprofits. The initial amphitheatre remains home to the wide range of experiential meetings in SL through which nonprofits from around the world have learned about such topics as fundraising, community building, effective online communications, Web strategies, and expanding online social networks. The Nonprofit Commons has hosted these meetings nearly every week since launch; they are regularly attended by representatives from an ever-changing mix of approximately 50 nonprofit representatives in SL.

The Nonprofit Commons has garnered significant media attention including interviews such as the one published in the *MSNBC.com* article entitled "Pixelanthropy: Charities Tap into Second Life" and the *Online Community Report's* "Expert of the Month." The Nonprofit Commons also has been highlighted in articles featured in the *New York Times, Nonprofit Times, Victoria Times, Contribute Magazine*, and *New Scientist Magazine*. More press highlights are available at http://npsl.wikispaces.com/Press+Coverage.

The Nonprofit Commons also has been showcased at real-world conferences:

- SLCC, San Francisco 2006, Chicago 2007
- Northern California Grantmakers Briefing, San Francisco, 2006
- SuperNova, San Francisco 2007
- Games4Change, New York 2007
- BlogHerSL Conference, 2007
- Online Community UnConference, Silicon Valley 2007
- California Association of Nonprofits Conference, Fall 2007
- Exploring Virtual Worlds for Social Work, Fall 2007
- Faster Cures, conference at Esquire North NYC, Fall 2007
- NTEN's Nonprofit Technology Conference, Spring 2007, Spring 2008

Coming speaking engagements include the Computer Refurbisher's Conference (Spring 2008) and testimony before the US Congress, House Subcommittee on Telecommunications and the Internet (April 2008).

Project Team

Susan Tenby, Senior Manager, Online Community Development, TechSoup, is responsible for the strategy and direction for TechSoup's community initiatives, including The Nonprofit Commons in SL. Ms. Tenby runs monthly online community meet-ups, is a frequent conference speaker, and has been interviewed about her work with The Nonprofit Commons by publications with international reach. TechSoup staff members also help to coordinate volunteer involvement and to track usage statistics for The Nonprofit Commons.

In addition to key leadership, vision, and support from TechSoup, much of The Nonprofit Commons success can be credited to a large number of dedicated volunteers who help with everything from scripting, designing, newcomer orientation, outreach, training, and event planning. In all, these volunteers have contributed an estimated 15,000 volunteer hours since launch. When a nonprofit accepts a virtual office space in The Nonprofit Commons, they agree to contribute roughly eight hours per month towards community-building activities, including weekly meeting attendance and interactions on the group's

blog and wiki regarding topics such fundraising in SL, building and scripting in SL, and SL how-to tips and best practices. Volunteers also have contributed significant assistance in technical sim set-up and maintenance. Through continuous communication and sharing with its volunteers and members, TechSoup remains responsive to the nonprofits served by The Nonprofit Commons and credits sustainable community engagement and commitment as a top reason for the success of The Nonprofit Commons.

Lessons Learned To-Date

Although the nonprofit office spaces housed at the The Nonprofit Commons in SL provide an important starting point and information hub for nonprofits, they have not encouraged as much interaction as originally expected. We have found there's a "stumble upon" factor in the way that individuals move through SL. That is, people tend to navigate towards large, open places where other people have congregated and are already interacting. (The SL map shows users where they are located within the SL grid and depicts other avatars near them as green dots. Users can move towards those avatar groups by simply walking or by clicking on those dot-groupings and teleporting to that location.) This phenomenon is in contrast to how users navigate through other types of media—moving towards data or stories, for example—and it appears to be unique to the virtual world experience. In SL, users proceed through the world as they do in real life—based on social interactions.

Similar to the grouping tendency described above, the weekly meetings in SL have emerged as the most effective means of building networks and sharing information for members of The Nonprofit Commons. Information kiosks; landmark-givers teleport hubs (that transport users to a new location); and notecards posted in other sims in other regions of SL also have proven highly effective at increasing the awareness of nonprofit-related events and encouraging participation. In addition, the real-world presence of The Nonprofit Commons has proven to be essential in building awareness of this resource—nearly all conference and speaking engagements have resulted in further media attention and invitations to present this work before funders and at additional conferences.

The connections and lessons occurring in the digital community seem to reinforce its sustainability. As noted in the paper, "Best Practices for Nonprofits in Second Life" (published by Global Kids in 2007, http://tinyurl.com/ysy59v%20), inter-organizational collaboration and the ability to interact with other groups and individuals with similar interests and goals is a strong motivating factor for many nonprofits to stay engaged in SL.

Technological Basis

The Nonprofit Commons digital community leverages several different Web 2.0 community-building and collaboration tools: SL, wikis, blogs, Google groups, and RSS feeds (to feed real-world information directly into SL billboards). This integrated Web

presence creates a comprehensive and interoperable digital community that functions within and across virtual world tools and platforms and allows participants to tap into the growing potential of these technologies and increase their impact in the real world.

Participants, Membership, and Beneficiaries

The Nonprofit Commons digital community supports nonprofit employees, volunteers, and friends of small and large nonprofits all over the world who believe that there is merit and great potential in collaborating and working in SL. Currently, the SL TechSoup Group is home to more than 500 nonprofit members and nearly 60 nonprofits occupy virtual office space in the two SL islands in The Nonprofit Commons.

Thus far, The Nonprofit Commons has helped nonprofits in SL create new partnerships, develop collaborative projects, and host joint events that build community and trust among different organizers. Ultimately, the real-world groups and communities that these nonprofits serve stand to benefit from the increased community-building, advocacy, outreach, and collaboration made possible by this digital community.

Importance for the Nonprofit Sector

It is often said that the nonprofit sector runs several years behind the ever-evolving technology curve. But through The Nonprofit Commons digital community, many nonprofits have vaulted ahead of this curve—perhaps for the first time. This interactive digital community has blazed a trail for nonprofits to improve access and remove barriers to the knowledge, resources, and potential community-building benefits offered by emerging social software, such as virtual worlds.

Examples of the purposes for which nonprofits use Second Life include the following:

- Providing low-cost, low-carbon alternatives to travel for fostering rich personal interactions that go beyond simple, text, voice, and video communications (e.g., OneWorld).
- Breaking down barriers to rich social interaction for persons with disabilities.
- Providing a safe environment for support and recovery services like the Alcoholics Anonymous and Narcotics Anonymous.
- A few organizations are experimenting with ways to mirror real-world fundraising strategies like American Cancer Society virtual Relay for Life.
- Offering rich experiential education that could not take place in real life, e.g., a virtual tour of working human heart or exploring the moonscape or low Earth orbit at NASA's CoLab.

Knowledge gained from participation in The Nonprofit Commons meetings and events has helped nonprofits increase their organizational capacity and improve technological infrastructure, build replicable tools in-world, organize virtual action and awareness

campaigns, and host mixed-reality events that bridge virtual-world communities with real-world social networking events (through live audio and video feeds that stream both to and from the virtual world) to raise awareness about their missions and causes. SL combines the intensity of video, the interactivity of the Web, and the immediacy of face-to-face discussion to create a rich experience that encourages innovation, self-expression, and relationship-building. The Nonprofit Commons provides the key to help nonprofits unlock SL's potential in support of their communities, their missions, and their vision.

Some Favorite Second Life Locations

Nonprofit, General
Nonprofit Commons: http://slurl.com/secondlife/Plush%20Nonprofit%20Commons/183/125/23
(brief tour: http://npsl.wikispaces.com/brieftour)
Commonwealth Islands: http://slurl.com/secondlife/Commonwealth%20Island/135/30/23
Association Works: http://slurl.com/secondlife/Association%20Works/128/128/0
Democracy Island: http://slurl.com/secondlife/Democracy%20Island/116/220/

Education/Youth
ISTE Islands: http://slurl.com/secondlife/ISTE%20Island/97/75/23
Global Kids on the Main Grid: http://slurl.com/secondlife/Teaching/210/162/25
Info Island: http://slurl.com/secondlife/Info%20Island/108/55/33
Eduisland: http://slurl.com/secondlife/Eduisland/119/119/23
Bowling Green State University: http://slurl.com/secondlife/Bowling%20Green%20State/141/135/25
Rich list of SL educational projects and spaces: http://sleducation.wikispaces.com/educationaluses

Art, Humanities, Media
New Media Consortium: http://slurl.com/secondlife/NMC%20Campus/138/215/43
The Sistine Chapel: http://slurl.com/secondlife/Vassar/174/82/25
Virtual Morocco: http://slurl.com/secondlife/Casablanca/133/83/27
Ars Virtua, New Media Center: http://slurl.com/secondlife/Dowden/8/18/52
The Globe Theatre: http://slurl.com/secondlife/sLiterary/28/29/22

Science
NOAA: http://slurl.com/secondlife/Meteroa/177/161/27/
Spaceflight Museum: http://slurl.com/secondlife/Spaceport%20Alpha/51/70/24
Genome Project: http://slurl.com/secondlife/Genome/138/85/29
Sexual Public Health Sim: http://slurl.com/secondlife/Education%20UK/28/58/23

Participant and Member Testimonials

I thought that the engagement of the SF and SL communities was much more seemless for this event than other mixed reality events I've attended. At least from the perspective of SL. Having meatspace speakers from and in the community definitely makes the experience way more enjoyable!

-- Lyre Calliope (Timothy Moenk), 8/14/07 Mixed Reality Event

SL contacts have resulted in RW donations of surplus equipment. Currently serving more than 200 locations in Wisconsin. Digital Campfires Foundation has connected with SL folks and as a result local corporations have donated almost a semi truck load of monitors and computers. We are working with SHAREwi.org in Wisconsin to technology equip and train folks at more than 200 food distribution sites throughout Wisconsin.

-- Docent Alturas(John Grozik, Digital Campfires Foundation), 9/14/07 meeting

Second Life has given America's Second Harvest the opportunity to increase the awareness of the organization and hunger in America. Our first introduction to Second Life was through a partnership with Kraft Foods. The Nonprofit Commons provides a community to discover how to utilize the virtual world to forward our individual organization's missions. As a result, we have appeared in news articles. The organization supports these efforts and recognizes that virtual philanthropy is still in its infancy.

-- Dan Michel/Jackson, 10/12/07

Bridges for Women Society have received a few small donations, and have nearly 200 visitors since we opened in August, that's 200 people who have learned about our program we would have never reached. We have yet to realize the full potential of incorporating Second Life into our existing on-line program due to lack of computers but the amazing amount of press Bridges have received just by participating in this pilot has been a real bonus we didn't expect. We believe we will only continue to benefit by the publicity. This is our 20th year assisting women who have been abused to return to the workplace and the opportunity provided by the Nonprofit Commons to maintain current with technology is priceless!

-- Buffy Beale/Buffy Bye, 10/12/07

I am rather new to the nonprofit sector, but in the few months I have been working in it I have been amazed by the helpful nature and wonderful service Tech Soup provides. The commercial alternatives are many times not viable within out budget, time and again I have turned to Tech Soup found what we needed to stay running or even improve our productivity.

They also have a great web forum that allows nonprofits to post tech related questions, and in my experience get rapid and informative answers. The forum allows small nonprofits to benefit from the infrastructure of larger nonprofits in the way of IT support, an expensive but necessary service in today's computer driven business world.

The forum actually introduced me to the weekly meetings they have in Second Life; a digital meeting area where individuals have avatars and can meet for 'face to face' interaction. In my case it's a chance to listen to global events and exchange ideas with a global representation of nonprofits. I recently joined a group of three other individuals; we are creating a web based database of nonprofit organizations including the ability to search for specific qualities or goals. Allowing anyone to enter in a few key words and find a nonprofit that fits their needs, and then find out more information (a web site, a Second Life office, or if nothing else a person to

contact). This is one more way they are making global links between nonprofits, creating a global support community, so that we can support our communities with good works.

To summarize, I am amazed and impressed by the services they provide and the links they help build. The agency I work for has local roots and I love that, Tech Soup helps us build those roots though increased productivity, and increased funding in a manner, as well as helping us build external links to exchange ideas on a global level.

-- *Noah Chesterman, Central Coast Energy Services*

Mr. MARKEY. Thank you, Ms. Tenby, very much.

Our next witness is Dr. Colin Parris. He is the vice president of Digital Convergence for IBM, and we welcome you, sir. Whenever you are ready, please begin.

STATEMENT OF COLIN PARRIS, PH.D., VICE PRESIDENT, DIGITAL CONVERGENCE, IBM RESEARCH, IBM CORPORATION

Mr. PARRIS. Good morning, Chairman Markey, Ranking Member Stearns and members of the congressional subcommittee. It is my honor to be here to testify before the subcommittee on what we consider to be a significant evolution in the Internet.

As readily evidenced by the rapidly growing awareness to heightened media coverage and ever-broadening usage, we have firmly entered a new era in the evolution of Internet capabilities. This era augments the significant capabilities of the Internet by extending the current participation, collaboration and innovation functionalities to create what we at IBM call the 3D Internet. At IBM, we firmly believe that virtual worlds like Second Life, which are one facet of the 3D Internet, have the potential to transform enterprise and government processes by increasing top- and bottom-line growth, improving efficiency and productivity, and augmenting our ability to innovate and spur entrepreneurial growth. These virtual worlds allow the deepening and enriching of a customer's product, service, or program experience, promoting and supporting commerce. They also increase individual and team learning capabilities, driving increased innovation with new products and services.

We are working with our large enterprise clients and government entities to leverage these emerging technologies in order to unlock the business value that we believe will have a direct economic benefit to all industries. This technology will spur entrepreneurial activity and drive business growth, resulting in accelerated job creation and prosperity.

To unlock this business value, there is a significant number of enterprise, government, educational, and nonprofit entities that are currently experimenting with new applications and services. These emerging applications can be loosely grouped into four functional categories. These are commerce, collaboration, training, and process management. Applications in the commerce category utilize the 3D spatial and simulation capabilities of virtual worlds to provide customers with a richer, more immersive experience of the product or service in an environment that can be customized to look and seem like their own. These applications support the lifelike envisionment of a new city from acclaimed waterfront lands, of a travel experience with a virtual staff giving a tour of the hotel and sights of interest, of a green data center infrastructure and process design, or of a newly remodeled kitchen or home. These enhanced pre-sales activities can increase the percentage of successful sales and the level of customer satisfaction.

Applications in the collaboration category are those that deepen the collaboration capability using 3D spatial functions to create new presentations or showings that leverage the space, distance, and simulation capabilities of virtual worlds. This would allow remotely distributed teams to collectively design and develop prod-

ucts, services, and processes, leveraging spatial simulation and shared experience capabilities to better communicate their needs and to foster greater innovation and reduced speed to market.

Applications in the training category leverage both the learning effectiveness associated with simulation-based instructions and the shared avatar experience of virtual worlds to allow team-based learning. In addition to the increased effectiveness of the training, there are significant cost avoidance benefits associated with reduced travel, lodging, and wasted time. These applications provide the improved training of civilian and military forces in situations of natural or manmade disasters or support the more accurate certification of expertise in complex, dangerous, or costly manufacturing and engineering tasks.

Process management applications leverage the simulation, spatial and immersive capabilities of virtual worlds to model and depict business, government, and social processes. This permits insights to be gained by allowing shared observation and analysis of the process through rehearsal and critical event simulation. These applications allow the optimizing of manufacture and healthcare, transportation and other processes using both physical model simulations and real people personified as avatars. These applications can allow us to increase productivity gains and cost gains before real-world investments are met.

The widespread adoption of these applications, however, is dependent on several underlying technological assumptions that are critical for success. These include improving the endpoint experience, providing an enterprise grade virtual world infrastructure, integrating legacy business systems and creating interoperability between virtual worlds. As these emerging capabilities are another evolutionary step in the development of the Internet, it is clear that we must continue leveraging the policy framework that has served us well and on which we have built significant experience and viable processes.

Eleven years ago, when the Internet era began, government and industry came together to create an appropriate policy for global electronic commerce, one that would stimulate its growth and development while addressing the policy-related issues. I understand you were there, Chairman Markey, when the framework for global economic commerce was announced by the White House. That framework, with its fundamental principles of allowing the private sector to lead, of avoiding undue restrictions, of enforcing minimalist, predictable, legal environments, still hold true today in this new evolution of the Internet.

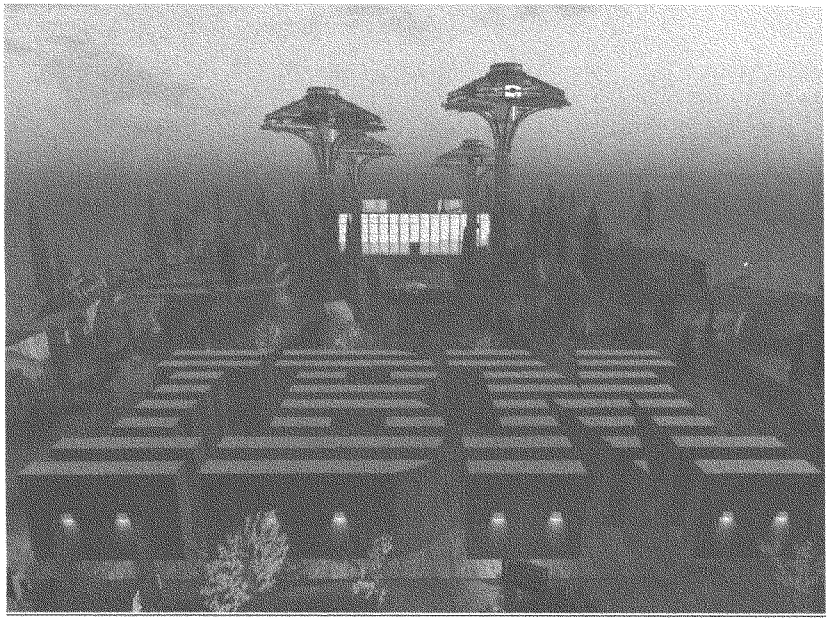
I thank you for your time and the opportunity to share these few remarks on this very significant evolution before us.

[The prepared statement of Dr. Parris follows:]

Congressional Hearing

House Committee on Energy and Commerce
Subcommittee on Telecommunications and the Internet

Online Virtual Worlds: Applications and Avatars in a User Generated Medium



Written Testimony Submitted
By
Dr. Colin J. Parris
Vice President, Digital Convergence
IBM Corporation

April 1, 2008

1. 3D Internet and Virtual Worlds.

As readily evidenced by rapidly growing usage, ardent discourse by industry and academic leaders, and heightened coverage by media and analysts we have firmly entered a new era in the evolution of Internet capability. This era augments the significant capabilities of the Internet by extending the current participation, collaboration, and innovation functionalities.

There are many terms used to collectively describe these new capabilities (one of the terms that we at IBM have used is the 3D Internet) but at their core they provide 3D visualization, synchronous social interaction through avatar personification, simulation, and immersion through new devices and interfaces. The expression of these emerging capabilities occurs in virtual worlds and virtual spaces.

Virtual worlds are computer-based, simulated, persistent, environments that support synchronous interaction between users personified as avatars. The avatar and environment representation can range from 2D "cartoon-like" to 3D "life-like" imagery with the interactive interface capabilities ranging from simple keyboard and mouse devices to gesture based devices and to headsets that interpret brain waves to initiate commands and reflect your facial gestures on your avatar in the virtual world. These virtual worlds also support community actions and may support economies.

Virtual worlds and spaces are quickly becoming powerful tools with the potential to transform enterprise and government processes by increasing top line and bottom line growth, improving efficiency and productivity, and

augmenting our ability to innovate and spur entrepreneurial growth. These worlds allow the deepening and enriching of the customer's product, service, brand, or program experience. They also significantly increase our individual and team learning capabilities driving increased innovation and collaborative problem resolution.

With the global transformation of enterprise and government processes made possible through the use of virtual worlds, we envision both an increase in entrepreneurial activities and growth in current business. As with our experience over the past decade and a half with the Internet has taught us there will be a new generation of companies created that provide business and consumer value with this new technology and interactive model. We will also see current businesses re-making themselves to engage in these opportunities and prospering as a result. There will be opportunities to create new virtual worlds and environments to augment and redefine marketing and commerce, to support virtual collaboration and events and to integrate them to real world events, to drive new modes of training and education, and to change and streamline business process management and operations.

These new environments will be integrated with the current Internet and legacy business systems, creating new business models to unlock business and societal value. All industries will experience direct economic benefit to their line of business results and will be positively impacted by the results of improved training and better collaboration. These opportunities will spur entrepreneurial

activity and incumbent business growth resulting in accelerated job creation and increased prosperity.

The Information Technology, Communications, Electronics, and Energy industries (to name a few) that provide the foundational support for this expansion will readily see the economic benefit of these opportunities. This growth will expand the base for ripple entrepreneurial activity and business growth with additional job growth and overall economic benefit.

1.1 Virtual World Growth.

At this time, strong growth in the virtual worlds market space is occurring as indicated by several key metrics. While none of these early indicators are guarantees of future market growth, we are cognizant of the fact that many of these indicators gave early insights into progress in prior Internet eras. At an aggregate level these indicators can be grouped into three categories: End Consumer Adoption indicators; Enterprise Investment indicators, and Ecosystem Development indicators. In all cases these indicators show significant growth supporting the notion that this is an accelerating and credible market space.

The End Consumer Adoption category includes indicators such as the increase in the number of virtual worlds, the increase in the number of avatars, and the increase in usage time in virtual worlds and spaces. There has been a marked increase in the number of accessible virtual worlds and the number of announced virtual worlds over the past year. While no definitive sources (analysts, academic, or government studies) have confirmed this, a survey of

several web sources and our internal efforts show a year-to-year (YTY) increase of 22-36% of "widely known" worlds.

The number of avatars is also increasing at a rate of over 18% with astronomical growth experienced at virtual worlds such Club Penguin and Webkinz (over 200% YTY). A survey of web sources report the number of online avatars range from 142-210 million. The number of premium (paying) clients is also on the increase in many of the worlds. Another indicator of growth is web usage. While much of the data is anecdotal, tracked statistics for leading worlds (such as Second Life) over 90% increases in usage over the past year.

The Enterprise Investment category covers a variety of items where the main indicators are the level of Venture Capital (VC) investment, the engagement of enterprises in known virtual worlds, and the related products and services entering this market space. *Virtual World Management* published that from October 2006 to 2007 there was $1.02B of VC investment in virtual worlds with an additional $425M reported in the fourth quarter of 2007. There has been significant enterprise (business, government, educational and non profit organization) engagement over the past two years with over 112 well known corporate brands represented in Second Life (as of this writing) and even greater educational, government, non-profit representation. Many enterprises have also created presences in other virtual worlds with many entities in multiple worlds. The Toyota Scion brand has representation in five virtual worlds.

There has also been a substantial increase in enterprise engagements as evidenced by the number of clients consulting and deploying 3-D Internet (3DI)

business value services (such as IBM's 3DI services). In addition, clients are using 3D virtual world content creation providers and service providers, or leveraging internal resources to create these virtual world and virtual space presences. There is accelerating growth in this category.

The final category of Ecosystem Development indicates increasing growth and interest as indicated by the number of announced partnerships and community initiatives in this emerging market space. Over the past year there has been a marked increase in partnership activity with a broad diversity of partnership arrangements across many shareholders. The collaborations of educational institutions and virtual world platform providers (e.g. Duke University and Proton Media), media companies and virtual world platform providers (e.g. Turner Broadcasting and Kaneva), and virtual world service providers and IT companies (e.g. Second Life and IBM) are accelerating the creation of value in the market space.

There are also other qualitative indicators of growth such as the increase in the number of communities (technological, legal, and societal to name a few) developing in this space. Of noted relevance are the open source initiatives such as Open Sim, Open Croquet, and Project Darkstar that are building open source virtual world platforms enabling rapid ecosystem expansion on these "free" platforms. These qualitative indicators are also showing strong growth in this category.

In summary, these three indicators show a strong acceleration of the market and portend that these emerging virtual world capabilities will globally

transform enterprise processes and increase the consumer experience in a manner that increases economic opportunity, jobs and prosperity.

2. Applications and Services in Virtual Worlds and Spaces.

There are several virtual world and space offerings that exploit these 3DI capabilities and state that they are commercially successful. The more notable of these offerings fall into two major categories.

In the first category are virtual worlds that combine social networking with virtual world capability allowing a richer, more socially collaborative and immersive experience. The dominant commercial examples exist as virtual worlds that are focused on kids and Tweens segment such as Club Penguin and Webkinz. There are other worlds that cater to older segment groups such as There.com and Kaneva.

In the second category are virtual worlds that provide social networking capabilities in a 3D virtual environment but also enable co-creation and support economies. These worlds provide the capability to create the landscape and buildings in the world and enable trade (barter) at some level. In some worlds there is a defined, supported, monetary system to facilitate trade between citizens. Examples of such worlds are Second Life and Entropia.

Both of these offerings are commercially available and illustrate viable business models that use the sale of premium subscriptions, rental of land, sale of real and virtual world objects, and the sale of advertising space. One indicator of business validity is the current acquisitions that are ongoing in this space.

Many of these worlds are being viewed as high potential media properties and are being actively sought. The acquisition of Club Penguin by Disney for $350M last year was a key inflection point for market demand. While these are valid business examples, we are still at the early stages of market development when considering the full potential of this technology. There is still potentially an enormous business value yet to be unlocked in this market.

2.1 Future Applications and Services.

To unlock this value, there are a significant number of global enterprises, government, educational, and non-profit entities currently experimenting with new applications and services with significant potential. These emerging applications can be grouped by into four functional categories or applications. They are:

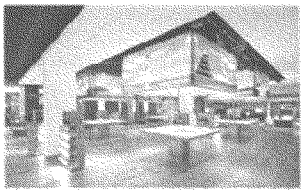
- Marketing and Commerce
- Collaboration and Events
- Training
- Process Management and Operations.

Each of these functional areas uses differentiating 3DI capabilities to transform a business or organizational process or to deepen or augment the experience of the end user. The transformation of the business or organization process can have as its objective to:

- Increase the current revenue stream or create a new product or service revenue streams

- Increase the efficiency and productivity of the process by reducing cycle time (time to product completion), reducing time to resolution of a problem, reducing cost, reducing process and complexity errors, or increasing throughput
- Increase the amount and degree of innovation by increasing individual and team learning and facilitating richer and more creative collaborations.

2.1.1 Marketing and Commerce.

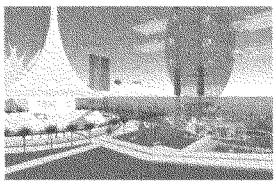


Marketing and Commerce includes applications that support a variety of requirement gathering and pre-sales activities. The requirement gathering activities allow creators, designers, and developers to engage the end consumers quickly to obtain feedback on key features of a current product or server or on a new product or service proposal. An early example that we, at IBM, have been engaged in is with the hospitality industry where hotel developers and operators are using the low cost simulation capabilities of virtual worlds to design new hotels and obtain consumer feedback. The consumer, as an avatar, can walk through these virtual hotels and comment on both the physical appeal and service operations. These virtual prototypes gain early market feedback and are cost and cycle time effective as they are done early in the development cycle thereby mitigating costly errors.

By utilizing the spatial and simulation capabilities of virtual worlds, consumers before purchasing are provided with an immersive experience using the product or service in an environment customized to look and seem like their own. A consumer can design a kitchen to match the dimensions of her or his kitchen and ask the designer (who can be in another part of the country) and their contractor (who can be remote in his office) to join as avatars in the virtual world to determine the best solutions to her or his taste, budget, and physical situation.

This "remote consulting" leverages the virtual world capability of "shared avatar experience" allowing a customer to shop in a manner that approximates that in the real-world, using friends, relatives, and experts for motivation, guidance, and support in the shared shopping experience. These enhanced pre-sales activities can increase the percentage of successful sales encounters, the level of customer satisfaction, and the degree of customer loyalty.

2.1.2 Collaboration and Events.



Collaboration and Events includes applications that deepen collaboration capabilities leveraging the 3-D spatial capabilities to create new visual presentations and simulations in virtual worlds. These presentations can show the full life cycle associated with a product and its use in different scenarios, highlighting variances in a more meaningful and visible way. These new 3-D spatial presentations can incorporate current media (PowerPoint,

video, or other streaming feeds) and extend the experience by using the simulation and 3-D capability to place the product and service in "life-like" scenarios and business situations.

Collaboration and Events also includes applications that enable the mirroring of real world events in the virtual world. This not only extends the reach of these events to users that are not able to participate in person but allows users to experience other perspectives at the event.

An example of a "mirrored" event was the work that was done by IBM at the Australian Open in which telemetry data, provided by sensors on the courts, was projected into a virtual world simulating the Australian open stadium. This data provided near real-time movement of the ball and the players depicting all of the live action in the virtual court. However, in this virtual event it was possible to change the viewing perspective to examine every shot from a different point of view or to be positioned as a player avatar to better appreciate the flow and nuance of the game from that player's perspective. These types of events are fertile grounds for introducing newcomers into virtual worlds and spaces as there is significant effort placed into leveraging all of the 3DI capabilities to produce a stellar ("wow"), memorable, experience.

This example illustrates the newly emerging capabilities but events can also be a launch point for other related follow on activities such as breakout sessions (virtual space collaborations) or training session at an event. All of these activities can be accomplished at a reduced cost in a medium able to embrace both attendees that are at the event and attendees that are remote.

2.1.3 Training.

Training includes applications that take advantage of the significant information retention associated with simulations and the shared avatar experience fostering team based learning. Studies on learning show that lecture based instruction (associated with complex subjects) results in 5-10% retention, group discussion based instructions results in 40-50% retention, while simulation based instruction results in 70-90% retention.

These significant learning advantages when applied to complex, dangerous, or high cost exercises (e.g. shutting down of a plant, management of a product line, assembly of a complex component, managing a natural crisis) provide a considerable improvement in both learning effectiveness and a reduction in cost while managing the risk to expensive equipment and time critical processes. One example here is the ongoing work on training simulations of an oil platform evacuation in a critical situation (i.e. a fire or hurricane). This training uses the physics game engine capability in virtual worlds to simulate the physical phenomena and the avatar capability to model the human unpredictability in a crisis situation. IBM is also engaged with government agencies that are exploring logistics training in mission planning exercises.

In addition to the use of simulation based training for complex tasks, there are other forms of training that have significant benefits. The creation of "mirror"

corporate or government campuses in a virtual space for the orientation and onboarding of new employees in remote locations provides both the ability to connect new employees with each other and to introduce them to distributed campus locations. These orientation sessions leverage the collaboration capability of virtual world to start and support communities of interest that meet in the mirror campus. In addition to the increase in training effectiveness, there is significant cost avoidance benefits associated with travel, lodging, and wasted time.

2.1.4 Business Process Management and Operations.

Process Management and Operations encompasses applications that utilize the simulation, spatial, and immersive capabilities of virtual worlds to model and depict business, government, or social processes. This permits insights to be gained by allowing shared observation and analysis of the process through process rehearsals and critical event simulations.

With critical event simulations, context relevant scripted and un-scripted scenarios can be used to test the resiliency of complex processes. This enables us to understand and manage the informal processes and human-error situations that tend to occur in these situations. These process rehearsal or management

applications can also allow us to determine productivity gains, cost saving, and risk mitigations before real-world investments and potential mistakes are made.

These types of applications also leverage virtual world capabilities to execute real world processes. Benefits can be gained from shared avatar collaboration across geographic boundaries while reducing costs of physical infrastructure overhead and error management.

One relevant example is in the area of product lifecycle management in the fashion design process. In this effort, major process components associated with product design, material selection, costing alternatives, product feature selection and productions were instantiated in a virtual space. Product decisions and tradeoffs can be made during virtual meeting sessions where stakeholders across the full lifecycle can make decisions at key process junctures leveraging each other expertise while viewing the product. This type of process transformation results in reduced cycle times as well as reduction in errors and travel cost.

2.2 Technology Requirements and Dependencies.

These emerging applications provide the base for a significant process transformation and economic growth, however, there are several underlying technological requirements and policy assumptions that are critical for success. While there are many individual technological requirements that need to be addressed they fall into three major categories. These are:

- improving the end point interface and experience,

- ensuring the presence of a business grade virtual world infrastructure, and
- integrating back end business systems and creating interoperability between virtual worlds.

It is instructive to note that the major requirements that are being proposed to ensure that virtual worlds are fit for business are similar in structure to those that were needed in the early era of the Internet.

The first requirement, improving the end point interface and experience, is a major contributing factor to the consumer experience which is a core differentiating capability of virtual worlds. At a high level, improving the endpoint interface and experience would require that the navigation and representation interfaces be easier to use to accelerate client growth. Graphics capability will also need to be improved especially when used for highly visual applications. Also required is the support of a variety of access devices for broader accessibility and faster end point response time for real-world like interactions.

The next requirement, and clearly an imperative, is the stabilization of the platform for high-volume, secure, business use. Stabilization requires that enterprise-grade requirements for scalability, reliability, availability, performance and serviceability are met. It would also require that all business integrity requirements pertaining to security, privacy, and identity management be met and/or exceeded. In addition, improving the tooling systems for enhanced creativity and improved content management for the 3D data is needed.

In order to maximize the transformation potential of these virtual world capabilities it is essential that the current business applications and data repositories be leveraged by integrating these core business systems into virtual worlds and spaces. This legacy integration is the third and mandatory requirement for the rapid dissemination of broad business capabilities into virtual worlds.

Interoperability between virtual worlds is also essential as it supports the network effect whereby a consumer avatar will have access to resources in other worlds and virtual worlds would have access to many more potential consumers. Interoperability between virtual worlds can allow movement of content, avatars, and capabilities among worlds leveraging the network effect to reduce cost, to reuse assets, to increase investment protection, and to mitigate business risk.

3.0 Policy Issues.

To realize the significant potential of these emerging capabilities it is imperative that we have a policy framework that allows market expansion and facilitates economic growth. As these emerging capabilities are another evolutionary step in the development of the Internet and electronic commerce it is clear that we must continue leveraging the framework that has served us well in the past decade and on which we have build significant experience and viable processes.

Towards this end the Framework for Global Economic Commerce that was established by the White House in 1997 should remain our guiding

framework for policy. Leadership by the private sector, avoiding undue restrictions, enforcing predictable, minimalist, simple legal environments, recognizing the unique qualities of virtual worlds, and facilitating on a global basis are all principles that are as relevant in this era as it was 11 years ago.

IBM has continued the use of this framework in this space with the creation and dissemination (internally and externally) of the Virtual Worlds Guidelines for IBM employees. The guidelines were created to re-affirm IBM's consistent policy position in the context of these new capabilities and to clarify any uncertainties due to the expected discourse in marketplace. These guidelines encourage employees to explore responsibly and to further the development of new spaces of relationship-building, learning and collaboration while being guided first and foremost by our values and our Business Conduct Guidelines. They outline 10 guideposts for consideration and empowering while limiting restrictions, regulations, and undue process that would hinder exploration and innovation. Our observation over the past year is that this has worked successfully.

In 1997, President Clinton said while announcing the Framework for Global Electronic Commerce,

"In the 21st century, we can build much of our prosperity on innovations in cyberspace in ways that most of us cannot even imagine. This vision contemplates an America in which every American, consumers, small-business people, corporate CEO's, will be able to extend our trade to the farthest reaches

of the planet. If we do the right things now, in the right way, we can lead our economy into an area where our innovation, our flexibility, and our creativity yield tremendous benefits for all of our people, in which we can keep opportunity alive, bring our people closer to each other, and bring America closer to the world."

That validity of that statement is equally as, if not more, apparent today.

As we examine the ever growing landscape of virtual world applications, the empowerment of the end consumners by their ability to make choices more suitable to their expectations, and the familiar embrace of these technologies by the younger generation of consumer and workers, it is rapidly become apparent that the adoption rate of these virtual world capabilities may exceed the rates that we have seen before. There is also a significant global interest in these new capabiliites as their enriching of the experience allow the representation of culture and idealogy in a manner that was not easily possible before. These social factors of generation and culture are additional significant motivators that will play a large part in the acceleration and success of this evolution in the Internet. Taken wholistically, the transformation potential of the evolving capabilities, the rate of growth of entitives and useful applications in this market space, and the social motivation factors may well enable this to be the most impactful Internet evolution as the human personification becomes much more closely integrated into the Internet.

Mr. MARKEY. Thank you, Dr. Parris, very much.

Our final witness, Dr. Larry Johnson, leads the New Media Consortium, a not-for-profit association of more than 250 world-class colleges, universities and museums focusing on emerging technologies. We welcome you, sir. Whenever you are ready, please begin.

STATEMENT OF LARRY JOHNSON, PH.D., CHIEF EXECUTIVE OFFICER, THE NEW MEDIA CONSORTIUM

Mr. JOHNSON. Good morning, Chairman Markey and Ranking Member Stearns and the rest of the committee. Thank you for allowing me this time with you, and let me begin by applauding your leadership in this arena. I think the work you are doing is extraordinary.

As you noted, my name is Dr. Larry Johnson, and I also have an avatar. Among the many exploratory projects that the New Media Consortium does, for more than 2 years we have led the largest educational project of any kind in any virtual world, one that involves hundreds of institutions and more than 7,500 individuals, educators and students all working and learning in the virtual world of Second Life. The project is self-sustaining, and it recovers all of its costs via operations and activities that are conducted within that virtual space.

My comments to you this morning are the reflection of the voices of that community, as well as my own. They see the work they do in Second Life as another facet of the work that they do on their campuses, and that is the first point that I hope to leave you with this morning about the nature of virtual worlds. Any dichotomy drawn between the activities in the real world and that of the virtual world we believe is artificial at best. Behind every avatar is a thinking, living person, and in the case of my community, we see little reason to distinguish one's virtual identity from the other aspects of yourself. I am the same person whether you encounter me here in this room or on the NMC's campus in Second Life.

My second point speaks to the notion of reality and unreality. Whatever happens in a virtual space, the space itself simply extends our notions of the real world, just as the Web extends our notions of the network. A virtual world like Second Life or other platforms like Project Wonderland are not games, serious or otherwise, and referring to the work done as games limits both the potential of the technology and the work it is enabling. After 2 years of focused research and demonstration projects in virtual spaces, we see them as nothing less than the evolution of the Internet from the flat two-dimensional Web in which it now resides into three dimensions, with all the richness and depth that it entails.

And my third and most important point about the nature of virtual worlds is this: The emerging landscape of virtual worlds represents as profound an opportunity, as profound a driver of changes in the ways we think, learn and work as any technology that has ever preceded it, and more so.

I am reminded of similar opportunities our Nation has faced in the past and how bold leadership and vision positioned America to make the most of those great moments in time. When the country was expanding westward, the Morrill Act set aside lands for uni-

versities, ensuring that education would flourish as the country expanded. When it was clear that commercial interests would only provide electricity to the cities, where profits were easy, the Rural Electrification Act brought the modern age to all Americans. And when television was new, leaders like Freda Henoch stood up to ensure that channels would be set aside for learning. And in 1991, when the World Wide Web was still just an idea, the High Performance Computing and Communication Act ensured that the United States would have the infrastructure in place to lead the 1990s, as it did.

We very much need that kind of visionary leadership today. Already, an industry is beginning to form an ecosystem around this technology, and more than 4,400 people make a full-time living as professional developers in the virtual world of Second Life alone. There are nearly 55,000 small business operators who operate in the microeconomy there. More than 1,400 islands have been designated for educational use in Second Life, which is 10 percent of the entire 65 square miles, which is quite remarkable, I think, and there are probably, by my estimate, about 4,000 educational projects going on in Second Life. There are so many that it is actually not possible to keep up with them anymore.

The future of virtual worlds that is yet to unfold is one that promises an exponential leap over what is possible with the technology today. Just over the horizon are cinematic-quality graphics, as several of the members have noticed, as well as seamless integration with business and other applications. Advances in social operating systems, in mobile devices and wireless technology are going to extend the 3D web in ways that will weave it transparently throughout our lives, and that web will connect us to each other, to goods and services, to knowledge and information in ways that we can only begin to imagine today. We stand at the frontier of that soon-to-come future right now.

Thank you for allowing me this time to reflect on its profound potential.

[The prepared statement of Dr. Johnson follows:]

Testimony of Laurence F. Johnson, Ph.D.
Chief Executive Officer
The New Media Consortium

COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON TELECOMMUNICATIONS AND THE INTERNET
U.S. HOUSE OF REPRESENTATIVES

April 1, 2008

"Online Virtual Worlds: Applications and Avatars in a User-Generated Medium"

Good morning Chairman Markey, Vice Chair Doyle, Ranking Member Stearns and Members of the Subcommittee. Thank you for allowing me this time with you.

My name is Dr. Larry Johnson and I have an avatar.

I also have the privilege of leading the New Media Consortium, a 501(c)3 not-for-profit association of more than 250 world-class colleges, universities, and museums focusing on emerging technologies. Among the many exploratory projects we do, for more than two years we have led the largest educational project of its kind in any virtual world, one that involves hundreds of institutions and over 7,500 educators and students working and learning in the virtual world of Second Life®. This project is self-sustaining, and recovers all its costs via operations and activities conducted within that virtual space.

My comments to you here are the reflection of the voices of both this community as well as those of the larger NMC membership, whom I polled as to what they would want to have you consider as I prepared this statement. They see the work they do in Second Life as merely another facet of the work they are doing on their campuses — and that is the first point I hope to leave with you this morning about the nature of virtual worlds. Any dichotomy drawn between activities in the real world and that of the virtual world is artificial at best. Behind every avatar is a living thinking person, and in the case of my community, we see little reason to distinguish one's virtual identity from any other aspect of their identity. I am the same person, whether you encounter me here in this room, or on the NMC's campus in Second Life.

My second point speaks to the notions of reality and unreality. Whatever happens in a virtual space, the space itself simply extends our notions of the real world, just as the web extends our notions of the network. A virtual world like Second Life or Project Wonderland is not a game, serious or otherwise, and referring to the work done in these spaces as games limits both the potential for the technology and the work it is enabling. After two years of focused research and demonstration projects, we see these spaces as nothing less than the evolution of the Internet from the flat two-dimensional web in which it now resides into three dimensions, with all the richness and depth that implies.

My third and most important point about the nature of virtual worlds is this: The emerging landscape of virtual worlds represents as profound an opportunity, as profound a driver of changes in the ways we think, learn, and work, as any technology that has ever preceded it — and more so.

Virtual worlds are already bridging borders across the globe to bring people of many cultures and languages together in ways very nearly as rich as face-to-face interactions; they are already allowing the visualization of ideas and concepts in three dimensions that is leading to new

insights and deeper learning; and they are already allowing people to work, learn, conduct business, shop, and interact in ways that promise to redefine how we think about these activities — and even what we regard as possible.

Just as the world wide web has unfolded over the last 15 years to erase boundaries between us and become part of the very fabric of our lives, over the next 15 years, virtual worlds will rapidly evolve into a rich three-dimensional extension of ourselves that will have profound impacts on the ways we interact, communicate, learn, work, shop, and conduct business.

Policy Issues for Consideration

These developments are not limited to American interests by any means — the excitement being generated by these new technologies is global. Just as we see the new frontier of virtual worlds and its opportunities begin to unfold, however, the United States is poorly positioned to take advantage of them. We have largely ceded our leadership in the Internet arena over the past dozen years; we are now 19th in the world in providing broadband access to our citizens, and that number has been worsening every year. More than that, the product we allow companies to deliver to our citizens is just one tenth the speed of the broadband commonly available in Japan — we lag at 14th in the world in the quality of our basic Internet service. Twenty other countries provide their citizens broadband Internet access at lower cost than what Americans pay for a generally shoddier product.

I am reminded of similar times and similar opportunities our nation has faced in the past, and of the bold leadership and vision that kept our nation on the track to greatness then. When the country was expanding westward, the *Morrill Act* set aside lands for universities, ensuring that education would flourish as the country expanded; when it was clear commercial interests would only provide electricity to the cities, where profits were easy, the *Rural Electrification Act* brought the modern age to all Americans. When television was new, the FCC ensured that channels would be set aside for education and learning; in 1991, when the world wide web was still just an idea, the *High Performance Computing and Communication Act* ensured that the United States would have the infrastructure in place that ultimately allowed it to lead the world in information technology throughout that decade; the *Next Generation Internet Research Act of 1998* ensured that our computer scientists would be able to develop the next generation of network technologies.

Yet despite the innovation of visionaries like Phillip Rosedale and his team, who created the virtual world of Second Life, the U.S.'s leadership in the emerging landscape of the 3D web is not at all certain. More than 70 virtual world platforms exist at this moment, according to an ongoing study by the American Federation of Scientists, and only a handful are being developed by American companies. While Second Life is by far the most successful today, we need not think back beyond America Online to remember how quickly things can change in this space.

At the same time, we are not addressing important social aspects of the issue either. When Americans came home to a new reality after World War II, the *GI Bill* ensured that the opportunities they needed were within their reach; *Pell Grants* extended the promise of an education to the disadvantaged in 1965, just as computers were emerging onto the scene. More than 40 years later, we've not extended the promise of technology to far too many Americans, and we've really not even begun to think about the geographic and global dimensions of the digital divide.

Where is that kind of vision today? Who will step up to ensure that we not only allow but encourage these new developments to prosper, and entrepreneurs and visionary thinkers to innovate? How will we address the twin challenges of a lagging infrastructure and a growing divide?

Congress can reverse our current technological decline and recapture the excitement and American spirit of innovation by putting policies into place that will encourage development of the 3D web and the virtual worlds that are its precursor. We need leaders today like Frieda Hennock, who as the Commissioner of the FCC in the late 1940s "became impatient for the day when television would become an electronic blackboard, a 'classroom of the air,' serving American students as the proscenium from which culture was to enter the living room of every home." There was strong bipartisan support for the *High Performance Computing and Communication Act*, sponsored by a Democratic senator, and promoted by a Republican president who predicted it would help "unlock the secrets of DNA," open up foreign markets to free trade, and encourage cooperation between government, academia, and industry. It did that, and more.

A hugely important result of this legislation was the development of Mosaic in 1993, the world wide web browser that launched the Internet as we know it — and changed the world in the process.

This kind of leadership is at the heart of what has made America the country it is, and is much needed today.

I encourage this subcommittee to take the first steps in embracing this new technology, so that each of you can begin to see the enormous potential not only promised by the evolution of the network into three dimensions, but already being realized today in communities across Second Life and dozens of other virtual world platforms, such as HiPiHi, There, and Project Wonderland.

The Nature and Growth of Virtual Worlds

Mitch Kapor, the current chairman of the board of Linden Lab, said of Second Life just this past week that it "touches something deep in people." My own experience, gleaned through the NMC's research and work in that particular virtual world, echoes that observation, and the idea is part and parcel of why this new technology is so compelling.

A snapshot of the experience across just one aspect of virtual worlds illuminates this well. There are many ways one might engage in real-time interaction at a distance, such as via a webinar, instant messaging, or even high-definition video conferencing, but in each of these, one never lets go of the essential reality that you are not together. Even with the best of these, a piece of glass separates the participants. One can do a very simple test to discern this — if you move close to the screen in a video conference, no one on the other end steps out of your way. They know that you are not really there.

In a virtual world, on the other hand, the participants each make a choice to move through that glass and meet in the middle, and in so doing, extend their physical presences into the virtual space. If you conduct the same test of moving your avatar closer to another person's avatar, he or she will move away, just as he or she would in the real world. Not only has that person extended his or her physical presence into the world via an avatar, but a sense of personal space as well. The two of you both know intuitively that you are somehow actually together. You have met in the middle.

It is this simple yet profound sense of being in the same place at the same time, seeing and doing the same things, that is at the center of what is new about this technology. No other technology has this compelling characteristic. The applications for it and for bridging time, culture, and distance are endless.

Nowhere among virtual worlds can one see this aspect so clearly as in Second Life. At the NMC, we see Second Life as the most currently evolved of the virtual world platforms today, and wherever this technology takes us, Second Life will be seen as the seminal first instance of what the 3D web might look like. The reasons for that are clear.

Second Life sits at the intersection of three deeply significant trends, and it is here that one should start in order to understand why this technology offers such profound potential. The first trend is an increasing focus on people as the organizing principle of the network, which has been fueled by hundreds of social networking applications, the anytime, anywhere access of wireless networks, and the clear desire of people to connect seamlessly in real time via these networks. At its core, a platform like Second Life is a social space, and it is that platform's success in meeting the need of people to come together that has driven its success and popularity.

The second trend is the ever-improving ability of our computing and communications devices to represent data and information visually across three dimensions, and to distribute that information in real time over the network. Because of the huge success in the gaming market (which is nearly doubling each year and is predicted to top US $69 billion by 2011), most new computers now have the capacity to render three dimensional images of startling fidelity. Second Life's contribution here has been to extend this capacity over a grid network based on thousands of servers so that a virtual world of considerable size and complexity can be rendered in real time and shared among tens of thousands of simultaneous participants.

Second Life is unique among the emerging virtual worlds because it also capitalizes on a third major trend — allowing users to generate content — which also the driving force behind such Web 2.0 phenomena as YouTube, MySpace, and Flickr. This has fostered a tremendous sense of ownership and pride among participants that in turn fuels the growth of the community.

It is hard to underestimate the complexity of the task Linden Lab has set upon, and as noted before, while virtual worlds have developed to the point where there are already many compelling examples and a large number of persuasive applications to which they have been put, all of them are at the very earliest stages of their development.

Nonetheless, the growth over the last two years has been remarkable — the number of Second Life accounts has increased by 86 times over that period, from 150,000 in January 2006 to over 13,000,000 today — the adoption of the technology is still an order of magnitude or more away from the numbers commonly associated with the 2D Internet.

At any given moment, more than 50,000 people from countries across the globe are actively engaged in Second Life, and those number are growing steadily. Just in the past week, more than 420,000 people spent time in that virtual world; add to those numbers the tens of thousands of people using other virtual world platforms at any given time for which published data are not available.

Despite the relative immaturity of the technology, virtual worlds are clearly compelling to a large and growing number of visitors.

Types of Applications and Services, Commercial and Non-Commercial
Our usage and tracking data show that these visitors are devoting considerable time to the virtual expressions of their lives, especially compared to the amount of time one commonly expects people to spend on a web page, which is measured in seconds. In contrast, the average stay of a visitor to the NMC's virtual campus in Second Life is 42 minutes.

In terms of typical engagement studies, spending three-quarters of an hour on any activity is consummately rare in today's fast-paced world. More than any other aspect of virtual worlds, it is the ability of the technology to keep people's attention that is driving interest in virtual worlds within the education and training sectors, and that interest is widespread. Over the past two years, an estimated 4,000 educational projects have emerged within Second Life alone, and of the 13,400 regions in Second Life that were active at the time of this writing, more than 1,400 of them were being operated by bona fide educational institutions. Add to this more than a hundred other projects on open-source platforms like Project Wonderland, Qwak, and Croquet.

Education is growing so fast in virtual worlds that it is no longer possible to maintain an accurate list of all the examples of education and training that exist. Immersive, high-fidelity examples can be found in dozens of fields and disciplines, and the list grows daily. Among the fields in which many examples may be easily found are these:

- Emergency Response
- Homeland Security
- Health Care and Wellness
- Biotechnology
- Nanotechnology
- Government Outreach
- Civic Participation
- Cultural Awareness
- Global Warming
- The Environment and Ecological Action
- Civic & Economic Development
- Business
- Languages and Cultures
- The Arts

The not-for-profit sector is not yet as active as education, but a number of key organizations, such as the Annenberg, Sloan, and MacArthur foundations, and the American Cancer Society have significant projects, along with hundreds of smaller not-for-profits.

Commercial development in the typical sense of how one might think of it on the 2D web has found less opportunity in virtual worlds, and there have been a few high profile experiments by companies like American Apparel and the Starwood Hotels that did not find the success they hoped for. In other areas, however, the economy of Second Life, while small in overall terms, is doing quite well.

The most notable aspect, as least in the popular press, is the burgeoning micro economy that is fueled by the virtual Linden dollar, which typically trades at about 265 to the US dollar. The latest numbers from Linden Lab identify about 55,000 small business owners operating in Second Life, but this number is somewhat misleading. By far, most make less than US$100 per month; only about 150 individuals actually make more than US$5,000 per month operating businesses completely within Second Life. Most of the businesses that operate within Second Life produce virtual goods that can be used to build out the world, provide entertainment and other services, or customize one's appearance.

A much less chronicled aspect of the Second Life economy involves the businesses operating in the ecosystem of Second Life for whom their work in virtual worlds is a real world enterprise. These companies, of which the NMC is one, operate using real currency, real contracts, and standard business practices. A recent survey by Linden Lab identified about 385 such companies

who together are expected to produce about US$60 million in revenues this year. These businesses employ about 4,400 people who deliver goods and services in the virtual world, but who work and are paid within the real world economy. The average annual revenue projected for these companies in 2008 is about US$156,000. A little more than a third of all the regions added to the grid by Linden Lab are developed using the services of these ecosystem companies.

A Look to the Horizon

Earlier in these comments, I noted that it is important to remember that we are right on the edge of the frontier of the 3D web, and that there are many parallels to the ways in which the 2D web unfolded over the last 15 years. We have many challenges to solve, some technological, but others in the realms of policy, business models, and access. The prevailing view among my colleagues is that the large part of these can be solved most easily by simply letting the visionaries and entrepreneurs working in these fields do what they do well — continue to innovate.

At the same time, there are always things government can and should do for the good of its citizens, and there are moments when leadership and action on the part of government is critically needed. As I noted earlier, when our nation has stood on the edge of opportunity in the past, we have been privileged to have had leaders with the vision to allow us to capitalize on it. This is one of those times, and we sorely need that sort of leadership right now.

What can Congress do?

First is to explicitly recognize that increasingly, telecommunications and the Internet are the same thing. For many of us, our phones are already our portal to the Internet, and in an industry that produces a billion mobile phones a year, that is fast becoming the norm. The devices themselves are already far more powerful and capable than the networks that connect them. We need regulations that decouple cell phones from calling plans and promote the growth of a truly world class wireless infrastructure.

From that starting point, we need a range of action informed by vision and clarity of purpose. What is needed most are these five things:

- programs that will spur the technical development of the 3D Internet;
- programs that add capacity to the woeful state of our information infrastructure and bring it to the communities and neighborhoods that currently have no or very poor access to broadband services;
- policies that require data and cellular networks to deliver the bandwidths and speeds needed to easily access these technologies;
- programs to ensure that educational institutions and students at all levels have the resources required to take full advantage of the potential of the 3D web; and
- programs and policies to encourage entrepreneurs to develop effective business models for this new frontier.

Beyond those vitally important actions, what is further needed is for government to engage the technology, to model effective uses of virtual worlds, and to promote programs and services that truly tap its potential to bring people together. This subcommittee, which focuses uniquely on the special issues embedded in telecommunications and the Internet, is the perfect place to start.

Imagine a future where conversations like this could be routinely held in a virtual world, where we understood that the technology not only provided the setting and forum for dialog, but was also seen as an energy-saving strategy, a cost-saving strategy, a boon to the environment, and a way to engage citizens directly in complete safety.

Imagine a future where complex scenarios like those that occur in emergency response or homeland security situations could be practiced over and over, just as pilots train to fly in unpredictable weather conditions.

Imagine a future in which learners did not just read about scientific and mathematical principles, or simply solve problems and equations, but were able to see and manipulate them in real time and space — a future where the elegance, beauty, and consummate practical applications of these disciplines are easy to see.

Imagine a future in which the disabled, sick, or simply frail easily interact with able-bodied people on the same terms, with the choice to set the wearying challenges of their conditions aside, or to join with others just like themselves — a future where even the autistic can find a voice, and barriers of illness or infirmity fall away, even if only for a time.

That future is here today. Each of these scenarios can be matched to the work that hundreds of talented passionate people are doing right now in Second Life, and the extraordinary things they are accomplishing highlight the profound potential of this technology.

The future of virtual worlds that is yet to unfold is one that promises an exponential leap over what is possible with the technology today. Cinematic quality graphics are just over the horizon, as well as seamless integration with business and other applications. Advances in social operating systems, mobile devices, and wireless technology will extend the 3D web in ways that will weave it transparently throughout our lives. That web will connect us to each other, to goods and services, and to knowledge and information in ways we can only begin to imagine today.

We stand at the frontier of that soon-to-come future today, and before us lies opportunity in every direction. Let's make the most of this moment.

Thank you for allowing me this time to reflect on its profound potential with you.

References

Compendium of Virtual Worlds
Federation of American Scientists
http://vworld.fas.org/bin/view/Main/VirtualWorlds

Game Industry Expected to Double by 2011
Gamasutra, February 2006
http://www.gamasutra.com/php-bin/news_index.php?story=8205

Metanomics Interviews Mitch Kapor, Linden Lab's Board Chair
Metanomics, March 2008
http://metanomics.net/26-mar-2008/special-event-friday-metanomics-interviews-mitch-kapor-linden-labs-board-chair

One Billion Mobile Phones Shipped in 2006
Computing, January 2007
http://www.computing.co.uk/2173516

Second Life Economy
http://secondlife.com/whatis/economy_stats.php

Mr. MARKEY. Thank you Dr. Johnson, very much.

And now we will turn to questions from the members of the subcommittee, and the chair will recognize himself.

Mr. Rosedale, you state in your testimony that 70 percent of the users of Second Life are outside the United States. Is there a correlation between the availability of high-speed, truly high-speed broadband overseas and its high growth overseas?

Mr. ROSEDALE. Yes, Chairman Markey, I think there is. Seventy percent of Second Life users are outside the U.S., and as you suggest, the rate of growth of those users within different marketplaces globally does seem to be related to the pervasiveness of broadband, as well as the general availability within social groups of both broadband and the kind of computers necessary to run something like Second Life. We, for example, see extremely high rates of growth more recently in Japan, where broadband access and computing is fairly universal, at least in urban areas. So I think there is a high sensitivity between broadband and 3D computing and the ability of these types of social virtual worlds to truly become generally used.

Mr. MARKEY. Now, I understand that Linden Lab reviews every transaction in Second Life over $10. What sorts of transactions would raise red flags for you?

Mr. ROSEDALE. Well, that question is related to essentially the internal Linden dollar currency. In Second Life, when users wish to withdraw that currency into local denominations, we take a look at those transactions. We have a variety of systems in place, as you mentioned, one that for sure looks at everything over $10. The virtual world demonstrates patterns of use when you look at, for example, avatars' transactions there, that are relatively easy with appropriate software and systems to discriminate and compare what look like routine transactions in the virtual world with something undesirable like, for example, people trying to do money laundering. Also, because the virtual world is a microtransaction environment where the average transaction has about a size of one U.S. dollar, it is relatively easy to spot larger transactions and then take a look at them and catch them. We have managed to, for example, maintain a fraud rate on the billing systems with Second Life which is about, for the last few months, a fraction of a percentage point, about 0.2 percent, where the industry average for e-commerce fraud is closer to about 1 percent. So we think that we can act as a model for the type of fraud systems that are going to be necessary to keep virtual world transactions legitimate.

Mr. MARKEY. And what recourse would a consumer have who felt aggrieved by a transaction in Second Life?

Mr. ROSEDALE. Well, like any open platform, the nature of individual transactions between individual users is not something that we attempt to regulate. Clearly, just like a transaction in the real world, in the virtual world, the buyer and seller have to be careful or be aware of what they are doing with each other. That said, the virtual world has a degree of accountability and journaling and traceability which actually in many ways is better than the real world. The likelihood of, for example, purchasing stolen merchandise is much lower in the virtual world due to the markability, the traceability of ownership, as an example, of a digital object. So I

think the probability that consumers will be distressed by the transactions they make there is probably lower on a sort of an hour-to-hour basis as comparing Second Life to life in a major city. So I think that we are in a reasonably good place there overall.

Mr. MARKEY. Thank you.

Dr. Parris, what types of jobs do IBM employees perform in Second Life?

Mr. PARRIS. There are a variety of jobs there, Chairman Markey. I will put them in the category I discussed before. We actually have sales opportunities. The IBM.com has a sales presence in Second Life. We also have a telecommunications island, a healthcare island, and a retail island, so we have sales opportunities, so sales jobs are being performed there. We have development jobs being performed there, because it has been used as a platform for collaboration on designs, and these are collaborations that can take place across the full breadth of a global company like IBM. We have training types of opportunities that go on there, and we also have opportunities related to process management and process optimization that happen within Second Life.

Mr. MARKEY. Thank you.

My time has expired. The chair recognizes the gentleman from Florida, Mr. Stearns.

Mr. STEARNS. Thank you, Mr. Chairman.

Mr. Rosedale, do any of the presidential candidates have an avatar in Second Life?

Mr. ROSEDALE. I am actually not sure. You know, Second Life is so large at this point that——

Mr. STEARNS. Oh, you don't even know?

Mr. ROSEDALE. We are often not involved in the creation of avatars such as Chairman Markey's avatar. So I am actually not sure. To my knowledge though, I don't think that the current presidential race has begun in earnest in Second Life.

Mr. STEARNS. OK. What is the difference—since you started the company, who is Linden Lab? Are they the company you hired? Why didn't you call it Rosedale?

Mr. ROSEDALE. You know, the name Linden Lab, which Second Life users often ask about, comes from the name of the small alley in San Francisco where we had our first office.

Mr. STEARNS. Oh, I see. OK.

Mr. ROSEDALE. We had a fondness to that street name, and so we named the company that.

Mr. STEARNS. Just another quick question. I notice in the resume you said you announced that you are stepping down as CEO on March 14. Why are you stepping down? It looks like you guys are just starting.

Mr. ROSEDALE. You know, we are about a 250-person company. We believe that the sort of demands of growing this complex piece of software are going to cause us to—as well as our just general user growth and revenue growth—are going to make this a much larger company. I personally am very passionate and involved in the fairly detailed design of and skeletal construction of——

Mr. STEARNS. Rather than the management of something like that. I understand.

Mr. ROSEDALE. So I am less interested in that sort of large company management.

Mr. STEARNS. I understand that you have a Second Life for teenagers, too, from 13 to 17, and obviously this Second Life that you have is for adults. So the question is, how do you keep the adults—I assume you try to keep the adults out of the teen Second Life and keep the teens out of the adult Second Life. How do you do that?

Mr. ROSEDALE. Well, obviously the members of the subcommittee have discussed this already. We take child protection and access to content for minors very seriously. As you mentioned, we have an area of Second Life, Teen Second Life, which is just for teenagers. Because that area is just for teenagers, and because the environment is social with lots of people generally in contact with each other and communicating at the same time, you can—and we are actually following a best practice that has been pioneered by a number of other companies here. You can encourage the teenagers to actively identify and warn us, the company, about anyone whose language or behavior suggests that they are not teenagers, and in fact, this method is a best practice due to the different ways in which teenagers normally communicate on the Internet——

Mr. STEARNS. I think the problem would be that once a person is in there, he or she could camouflage themselves. What do you take as a front end to stop people from getting in, assuming that they give the money, they are ready to go, but let's say they are 55. I mean, how do you check?

Mr. ROSEDALE. Like most Internet services, there are of course limits to how much we can check across an electronic——

Mr. STEARNS. Because of personal privacy.

Mr. ROSEDALE. Right. Exactly. But we do, however, require a stronger degree of initial identity for signing up for the teen version of Second Life.

Mr. STEARNS. Do you ask for a Social Security number?

Mr. ROSEDALE. We do not ask for a social.

Mr. STEARNS. Do you look at driver's licenses?

Mr. ROSEDALE. We don't ask for a driver's license. We ask for——

Mr. STEARNS. If you don't have a Social Security number and you don't have driver's license, how do you know the age of the person?

Mr. ROSEDALE. We ask for credit card information, telephone information and, of course, we ask the user to self-describe their age. But as I said, this——

Mr. STEARNS. A lot of people would not give the truth. If they are going there with overt intent or covert intent, they wouldn't necessarily be truthful. So at the front end it doesn't sound like you are screening them beyond their own word.

Mr. ROSEDALE. We are screening them as much as we can across this type of connection and in keeping with what, generally, Internet services are able to ask about their users. But as I mentioned before, the segregation of that audience into its own world and the fact that it is rigorously self-policed, people are very aggressive about identifying anyone who they think shouldn't be there, along with the vernacular of conversation that kids take as opposed to adults has reduced—has at least thus far provided us with no evidence of——

Mr. STEARNS. Is the FBI involved at all when you find people? Do you actually bring in the FBI?

Mr. ROSEDALE. We actively and proactively have involved the FBI in both—well, more actually main grid, as we say, activities on the adult side where we have involved them in looking into cyber crimes, where people have tried to deny service.

Mr. STEARNS. My time is expired. One last question. You mentioned you are not proud that Second Life is making money, I think you said. Can you explain why you are not proud it is making money, because I think to exist it has to make money.

Mr. ROSEDALE. Oh, no.

Mr. STEARNS. Did I misinterpret? You said something to the effect——

Mr. ROSEDALE. I was actually saying that as an entrepreneur myself, a lifelong entrepreneur, I am very proud that users in Second Life——

Mr. STEARNS. Are making money?

Mr. ROSEDALE [continuing]. Have been so, as Dr. Johnson was saying, have been so successful actually making money for themselves in the world. There are 50,000 or so people, individuals, who appear to be making a sort of profit net of fees in Second Life.

Mr. MARKEY. The gentleman's time is expired.

Mr. STEARNS. Thank you.

Mr. MARKEY. Strong capitalist sentiments in Second Life.

The chair recognizes the gentlelady from California, Ms. Harman.

Ms. HARMAN. Thank you, Mr. Chairman. I just want to note the lovely humor in this hearing in addition to the serious content. It is April 1, and I thought I would recommend to everybody the first page of today's Roll Call, which is truly hilarious, and we should laugh some of the time. I trust the panel and you agree. Yes. OK.

Now, to the more serious stuff, I have in my hand something from the London Sunday Times online, and the heading is "Virtual Jihad Hits Second Life Website." I would like to ask unanimous consent to put this in the record.

Mr. MARKEY. Without objection, it will be included in the record.

[The information appears at the conclusion of the hearing.]

Ms. HARMAN. Thank you.

The first two paragraphs read this way: "Islamic militants are suspected of using Second Life, the Internet virtual world, to hunt for recruits and mimic real-life terrorism. Police and the intelligence services are concerned that it may have been infiltrated by extremists to proselytize, communicate and transfer money to one another. Radicals may also be responsible for 'virtual' terrorist attacks in which buildings depicted on the website are blown up." Now, these are just allegations, and I am certainly not asking these witnesses to confirm these allegations, but I do want to ask about the general subject. You heard me in my opening remarks say that there is a huge plus side to this, and then there is a possible huge downside to this. I am not advocating censorship. I want to repeat that to all the groups out there listening in. I am not advocating censorship. But I am asking what we can do in clear-eyed fashion to make certain that these glorious tools are not abused and not just abused but changed into tools that facilitate the use of terror

attacks on innocent civilians around the world, something that we are increasingly getting used to.

So let me start with Mr. Rosedale. You said in your testimony that Second Life prohibits illegal activities, including money laundering and gambling. Can you tell us more about what specifically you do?

Mr. ROSEDALE. So as I mentioned earlier, when people actually extract money from the virtual world, we run that money through several processes, and we built these over the last couple of years and think they are a good model for this type of system in general. First is that payouts which are larger than $10 U.S. in value are scrutinized. When we say that we do that, we mean that a person looks at the record of transactions that have been made in the virtual world. We have a number of tools that allow us, for example, to aggregate together account activity over multiple accounts if there is a risk that those accounts are collectively being used to, say, move money around in the virtual world. We believe that the degree of scrutiny that is created by the transaction history that one creates as they use a virtual world is quite rich, and the pattern recognition of non-standard behavior, something outside the rather obvious range of consumption that people make when they are using the virtual world, whether for work or for entertainment, is easy enough to spot that we are very likely to see on the money side those types of transactions happening.

More broadly, let me add two things. One is that, with regard to a concern about specifically terrorist activities, though there has certainly been discussion about this, we as a company and as the final point of monitoring have never seen any evidence that there is any such activity going on in Second Life, but the second thing I think more broadly about virtual worlds to be said is that because we have a stronger identity there, a kind of a history of activity, a history of financial activity in many cases that is recorded, it is likely that virtual world activities are somewhat more policeable and the law somewhat more maintainable within virtual worlds than it is today on Web sites, and I think that point is an important one.

Ms. HARMAN. Well, let me just ask the other witnesses, too, do you have a comment on this or a suggestion to be made? Clearly these allegations in the Sunday Times I assume were not made lightly. It sounds from your testimony as though you think that they are not true because you would see this activity, but nonetheless, do other witnesses—my time is running out—have any suggestions about what we can do to assure that this glorious tool is not abused in this very serious way?

Mr. JOHNSON. If I might speak to this one, in my 2½ years of being in Second Life virtually every day and interacting with thousands of people, the one thing that I have come away with is a tremendous sense of how much the people in there regard that community, and I think the strong asset in that particular virtual world that it has against that type of activity are the residents themselves, who simply would stand up almost as one if they saw things of real concern like that. I can assure you, and I am sure Philip could echo, that they are not shy about sharing what they see in that world if they don't think that it is proper behavior.

Mr. MARKEY. The gentlelady's time has expired.

The chair recognizes the gentleman from Illinois, Mr. Shimkus.

Mr. SHIMKUS. Thank you, Mr. Chairman. I do not have an avatar. I am not sure that I am going to get one either, but it is interesting. But this brings up some other issues, and Dr. Johnson, in your written testimony you point to the OECD rankings, and this is a thing we have debated here numerous times and claim that the United States is in poor position to take advantage of virtual worlds such as Second Life. Since my time is short and in the style of Chairman Dingell, I have four quick questions, if I have time afterwards I will let you elaborate more, but a yes or no would be helpful. Are you aware that Dr. George Ford completely debunked the OECD rankings at our hearing last year by demonstrating that if every country achieved the goal of 100 percent broadband penetration, the United States would actually drop in the rankings under the OECD methodology of measuring broadband lines per capita?

Mr. JOHNSON. No.

Mr. SHIMKUS. Are you aware that based on Linden statistics, the United States has the most Second Life users of any country, representing one-third of the active Second Life population, almost four times the second place United Kingdom and more than the next five countries combined?

Mr. JOHNSON. Yes, I am.

Mr. SHIMKUS. You are very good with this yes and no. Most folks would like to interject here. Are you aware that even according to OECD, the United States has 66 million broadband subscribers, more than any other country, representing almost one-third of the broadband subscribers in all OECD countries and more than the next three countries combined?

Mr. JOHNSON. I am aware that we have a solid number more people with broadband than anyone else.

Mr. SHIMKUS. And are you aware that if we break U.S. residential broadband penetration down by State to make the size comparisons more realistic, U.S. States would take eight of the top ten spots if ranked with the European Union countries, and the bottom three States would be higher than the EU average?

Mr. JOHNSON. No, I am not aware of that.

Mr. SHIMKUS. And why I go to this line of questioning, I have done this before, is that I am ticked off at us being compared to Europe. I served in Germany 3 years as an Army officer. You could drive across Europe in 5 hours. I can't drive across the State of Illinois in 5 hours. It is just unfair to do a comparison. It is like apples and oranges, and so that is why I get on this little rant every now and then. We are doing great, and I think we will continue to do it. I am a pro-market competitive Republican. We have got to encourage capital flow, businessmen to take risks, get a return on that investment. I am always concerned on the government intervention side, government picking winners and losers, manipulating other people's properties, and so that is where I come from. I may give you some time if I can get through my other lines, but I appreciate those responses, and that is kind of my frustration on this.

Mr. Rosedale, I understand that you are only allowing certain authorized users to attend this virtual version of this hearing in

Second Life and are blocking others from attending. Is that because you recognize that sometimes some users can interfere with others' enjoyment of your service, making network management necessary in certain circumstances?

Mr. ROSEDALE. Well, I would say broadly that yes, Second Life is a very powerful environment or platform allowing people to do lots of different things within it, and therefore much like in the real world, you do often establish, say, a capacity limit. In Second Life, you can even have pragmatic demands on whether someone can, say, bring a really elaborate avatar to an event where the presence of that avatar would essentially slow down the performance of the computers of everyone else at the event. So this particular event, I am not even sure how we set this one up. I think we did a simple ask to be here, and we will generally let you in. There is a pragmatic limit today in virtual worlds on how many people can be in the same room at the same time, so we also often have to do an invite list for events that might draw more than, say, 100 or more people interested in attending.

Mr. SHIMKUS. Yes, that is great. I appreciate those comments.

Mr. Rosedale again, what about proselytizing? I am a Christian fundamentalist. Are there churches and are there church groups and communities or others that are actively using this?

Mr. ROSEDALE. There are definitely many church communities that are using Second Life. I think as we touched on, the power—one of the significant powers of Second Life and generally of virtual worlds is their ability to very rapidly establish rapport between individuals, potentially individuals who are across cultural or even language barriers that they wouldn't normally be able to come into contact across, and therefore I think that messaging like that and group formation of that sort is something that will be greatly changed and, I think, enhanced by virtual worlds.

Mr. SHIMKUS. Thank you, Mr. Chairman. If I could just for one second just finish up on—I am a democracy and freedom advocate around the world. I deal with democracy movements. One would be like the dictatorship in Belarus, where they attack, they kill journalists, they deny freedom. This is really a possibility if people could get on the Web and broadband capabilities for another way to enter discussion, freedom, networking of democracy advocates around the world. If they are doing it with terrorism, the flip side could be true also.

Mr. ROSEDALE. I think that in general what we are seeing, some of the conversation and debates and town halls, as we mentioned earlier, that have gone on in Second Life are great examples of a very direct and honest and rapid conversation that one can have safely with a variety of interested people, and I think that for politics generally, this is something that will be, I hope, very empowering.

Mr. SHIMKUS. Thank you, Mr. Chairman.

Mr. STUPAK [presiding]. Thank you.

Ms. Tenby, how many nonprofits currently operate in Second Life?

Ms. TENBY. I do not know the actual number of all the nonprofits in Second Life, but I can respond from my own community. So my own community started with just a handful, about 20, and we now

have over 400 members, 400 nonprofits represented. We have currently two sims which are nonprofits—sim is an island basically. We have two nonprofit islands housing about 70 or so—70 to 75 organizations, and the other members are volunteers of organizations. So about 400 members from approximately 60 different countries.

Mr. STUPAK. Thank you.

Let me ask unanimous consent that the American Cancer Society wishes to put in a statement. Without objection, so ordered. It will be entered in.

[The information appears at the conclusion of the hearing.]

Mr. STUPAK. Mr. Rosedale, what is the minimum high speed residents need in order to get into the virtual world? You have to have high speed, so what is the minimum requirement, and what is the ideal?

Mr. ROSEDALE. The minimum requirement in terms of bandwidth is basically any broadband connection, whether wired or wireless. Second Life typically operates at several hundred kilobits per second, meaning that it will basically work on any consumer broadband network. That said, Second Life scales and can scale to meet the maximum amount of available bandwidth, which means that the quality of the virtual world experience will be sensitive to the quality of the broadband connection as well as the computer that an individual has. So as we improve the technology, we will see rapid commensurate gains in the quality of the virtual world experience.

Mr. STUPAK. In my opening statement, I mentioned being chair of Oversight and Investigations, all the work we have done on child predators online and Internet service providers, and there were some questions along those lines. It appears that your review, if you will, of an application is based on credit card, telephone number, and then you ask age. But once they get into your virtual world, how do you—other than other people raising suspicions, do you have any other mechanisms or any other safeguards you have in place to try to find these online predators?

Mr. ROSEDALE. Well, to date, we have—as we mentioned, we have a general ability which we use to review the history of both communications transactions and behavior generally.

Mr. STUPAK. How long do you keep that communications transaction?

Mr. ROSEDALE. We typically keep that information for a period of several weeks, which is enough to review any allegations that are made. The community is aggressively self-policed. Where we have any information that we need to be concerned, we certainly can and will as a staff look into the activities that are going on in the world. I should note that we have to date had very little to no activity of concern, and in those cases we have been very proactive as a company about bringing these things to the attention of the authorities. So again, we view child protection as being paramount, and beyond the concerns about maintaining an open——

Mr. STUPAK. And have you set up any kind of a sting operation within your organization——

Mr. ROSEDALE. We have tried to——

Mr. STUPAK [continuing]. To see who is out there?

Mr. ROSEDALE. We have not, although I suspect that other law enforcement agencies may well have done so, but we as an organization have not, nor have we felt the need at this point to do so.

Mr. STUPAK. Dr. Johnson, if I may, many of these applications are designed to keep the audience engaged, and especially with education, they reward them for the time investment. Do you believe that a user could be logged onto virtual worlds for too many hours a day, basically addicted? Have you seen that with——

Mr. JOHNSON. That is a concern that I think goes across the video game market certainly, and I think it is something that we need to be aware of. In my own experience, I have not really seen any situations like that in an educational context, the activities that we have for students to be engaged in are fairly well defined. You know, of course, they can occupy the world on their own time, but we are not seeing any issues about that. There are lots of conversations that are held within education on this topic. I think as a general rule, educators are very sensitive to the downside of spending too much time on computers in general.

Mr. STUPAK. Right, but after they were logged onto your educational sites and they went into another part of the virtual world, would you know that?

Mr. JOHNSON. No.

Mr. STUPAK. Mr. Rosedale, are there any efforts to limit excessive use of their application?

Mr. ROSEDALE. You know, this question of excessive use I think is a fascinating one. It is very sensitive to what the application use is. Second Life, of course, and virtual worlds generally, will allow so many different types of use that the question of whether addictive or overuse is problematic is highly sensitive to the activity. If as a kid you are hanging around in virtual worlds trying to kill monsters, it is almost unquestionably the case that too much of that is going to make you unable to perform well in human society. On the other hand, trying to learn something or build a business in Second Life, I would argue is in many cases a kind of a lemonade stand experience that is superior to a lot of other forms of learning that you might have around you. So I think there is a sensitivity to how much—what people are specifically doing on the virtual world that will drive where the limit should be on usage.

Mr. STUPAK. But Linden Lab doesn't have any limitation on usage?

Mr. ROSEDALE. No, sir, we don't impose a limit on how much any individual is able to use the system.

Mr. STUPAK. I think Mr. Stearns has a couple more questions, so let us go a second round.

Mr. STEARNS. Thank you, Mr. Chairman.

Dr. Parris, you had mentioned that the third-generation Internet is doing—or the next generation of Internet would be three-dimensional. So forgetting Second Life for the moment, do you visualize that in the future the Internet will be three-dimensional across the board, and how will this be implemented?

Mr. PARRIS. What I believe will happen here is what we have seen in other eras of the Internet. We will see the gradual inclusion of everything that went before. So you will have all of the capabilities you had with your search and access enhanced by these three-

dimensional capabilities. So I would be, for instance, browsing on a normal two-dimensional Web site, and I would decide at that point in time I would like to include my friend to do maybe a look at the kitchen or a redesign of a room, and I can then put that person in a virtual world, and we can do that. So it is an inclusion of what we had before with what we have now, because, again, it all depends on the application the customer and the business is trying to achieve.

Mr. STEARNS. With IBM's position on Second Life, are you actually making money then, or is it just a marketing approach?

Mr. PARRIS. Well, again, I can't make any judgments on making money, but I will say this, because there are a couple of ways that you can look at this. One is clearly businesses experimenting right now with——

Mr. STEARNS. So it is an experiment of marketing for you, PR more than an actual business plan of making money?

Mr. PARRIS. Well, there are some cost savings that occur, for instance, in training. Rather than people meeting face-to-face, there are quite a few groups that go into the virtual world and do training sessions or do collaboration sessions, so there is cost avoidance in terms of sending people traveling, lodging, those types of things. So there is money to be made in terms of lower costs, cost avoidance. There are situations in which we have seen clients come in and do designs in the virtual world and design a hotel.

Mr. STEARNS. But you could do video conferencing in IBM and get the same thing accomplished with your employees or your customers.

Mr. PARRIS. Except for the simulation part. Because of the low-cost simulation, you can now find ways to really express what you are trying to show about a product experience. I can actually take you into a cruise ship we are building and show you what the staff would be like. The staff would be real people. I can actually show you when the waves move in what you would see.

Mr. STEARNS. And you can't do that except in Second Life? What I am trying to find out, what is there in Second Life that makes IBM want to go in other than PR? Is there something constructive, tangible?

Mr. PARRIS. Yes, there is. I think all of those pieces are tangible. The visualization is a familiarity that people have, so you will have more people engaged. The simulation is a capability that you have of expressing either new designs or expressing how my product works best for you in a way that is customized that makes people want to buy more. So those are viable ways. The training, we have looked at the fact that if you do simulation-based training, the retention is much higher, so it is much more cost-effective training people that way.

Mr. STEARNS. I see.

Mr. PARRIS. So there are a number of ways in which this actually does make money, but we are early in the cycle.

Mr. STEARNS. You are just exploring at this point.

Mr. PARRIS. Exactly.

Mr. STEARNS. Dr. Johnson, you had indicated that the difference between the person and his or her avatar, you treat the identity no differently. I think those were your words. But I am not sure

I agree with you, because Ms. Tenby has given her avatar a name which is a glittering name which is pretty dramatic——

Ms. TENBY. And my appearance is a pink cat.

Mr. STEARNS. Yes. I mean, here she is quite conservative in her dress, but her avatar is pretty quite showy, I guess, and I would think that people sometimes go into Second Life for the purpose of changing their identity or experiencing a lifestyle that if they can't own a house in Malibu, in Second Life they can. If they want to own a motorcycle, they can, or perhaps if they want to have a whole different kind of lifestyle, they do. So my feeling is that I am not sure that you can say that the identity is the same between the avatar and the person. Maybe I misunderstood you.

Mr. JOHNSON. I think you may have. There is a difference between how one chooses to express themselves. You have a great many more avenues for self-expression.

Mr. STEARNS. But I think people express themselves in Second Life in a way that they wouldn't express themselves in real life because they can't.

Mr. JOHNSON. Nonetheless, they are still the same person. That is my point. And the names are really a reflection of the platform. On other platforms you can use your actual name. In Second Life, a choice that they made was that you had to pick from the last names that they provide you, and that leads to a playfulness about it. You know, there certainly are all forms of avatars that people can take. You can be a cat, whatever you would like to be. You don't have to actually even be an animate thing. You can be a cube, if you like. At the end of the day, what my experience is in working with the 7,500 people we work with, is that we connect in the same ways that we connect in real life, despite the fact there may be a playfulness at times, what some people's choices are, or they may be exploring, you know——

Mr. STEARNS. Mr. Rosedale, do you agree with that, what he is saying?

Mr. ROSEDALE. I think that people are both—I think people are extending their identity in the virtual world. As you said, Congressman, the——

Mr. STEARNS. I mean, that is the joy of this thing, that you can have another life, and you can do things that you cannot do here because, let us say, you are a computer analyst, and you work 8, 9, 10 hours a day. You come home, you go into your home, and you don't have much of a social life, you can get on Second Life and have a whole new social life.

Mr. ROSEDALE. You know, I think that the information age has just generally allowed us to essentially come closer in our interaction and our projection of identity to what we imagine than what we are sort of physically able to project, and I think that that is seen in Second Life. But as Dr. Johnson says, there is a sort of a—I think what Dr. Johnson is trying to say is, when you are in Second Life, there is a very strong sense that you are in a way becoming more of yourself. There is a very, very strong sense of——

Mr. STEARNS. Self-actualizing who you really will be some day.

Mr. ROSEDALE. True. Self-actualization, I think, is a good description. People have an intense attachment to the identity that they create there, which is one of the things, as I mentioned ear-

lier, that makes the environment potentially quite safe as it grows, is because those identities are extremely durable and sustained. When you meet people there, when you walk up to someone, you are generally interacting with people who you know through these lengthy identities. So while there is a question of how we tie that back to the real world, a benefit that the virtual world has is that it has a real lack of anonymity. There is a draw to us all, whether in a business or commercial or social context, to create strong identities which are then connectable to us and to our histories of behavior.

Mr. STEARNS. Thank you, Mr. Chairman.

Mr. STUPAK. Thank you.

Well, let me thank everyone on this panel, and thank you very much. It was a very fascinating hearing, and I am sure we will hear more of it as it continues to grow and explode. The one thing in a virtual world though, to my friend Mr. Stearns, it won't make the Minority the Majority. So we are still safe. So thank you.

[Whereupon, at 11:15 a.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

STATEMENT OF HON. JOHN D. DINGELL

Mr. Chairman, online worlds such as Second Life are exploding in popularity. While these worlds offer Internet users new ways to interact online and encourage creativity and entrepreneurship through user-generated content, they also raise questions about online behavior and activities. I appreciate the Chairman's holding this hearing today to learn more about the possibilities and pitfalls of this new virtual space.

Some of the applications virtual worlds can offer are intriguing. In Second Life, users can attend virtual college courses, and corporations have opened virtual offices. Second Life has also afforded nonprofits a new platform in which to raise money and awareness. For example, the American Cancer Society was able to raise more than $100,000 through a virtual walk-a-thon last year. The Federal Government has even invested in Second Life through the funding of a virtual nuclear science program, and agencies such as the Federal Bureau of Investigations and Central Intelligence Agency provide training using Second Life.

I find it interesting that virtual worlds have established their own currencies that have exchange rates with the U.S. Dollar. Ensuring that such virtual currencies are consistent with our financial services laws is worthy of further consideration.

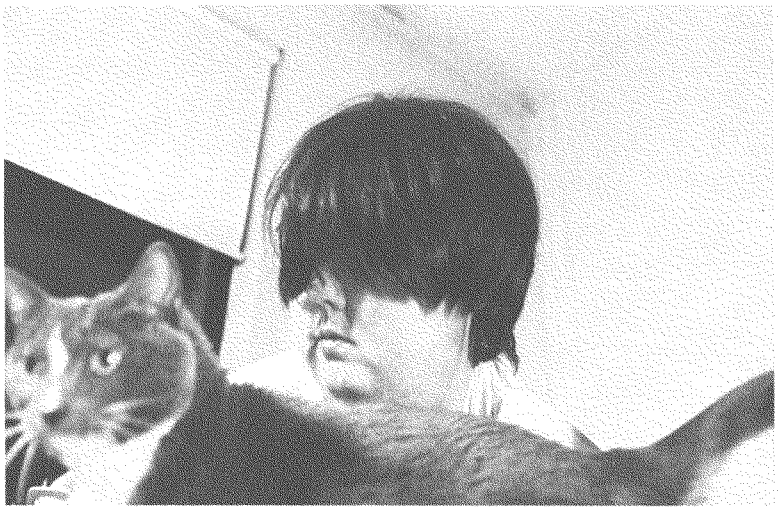
Virtual worlds also face potential problems regarding the safety of their users, fraud, and abuse. For that reason, I applaud Second Life for turning away users under the age of 18. Younger users are instead directed to a more circumscribed teen version of the virtual world. I was also glad to see Second Life ban all casinos and Internet gambling in its space, as well as shutting down banks. As with any innovative technology, new problems will arise as more and more people enter the virtual space. I will be watching to see how virtual worlds proactively address issues that emerge in the future. Thank you.

« Back to Article

WIRED MAGAZINE: 16.03

The Truth About Autism: Scientists Reconsider What They *Think* They Know

By David Wolman 02.25.08



Amanda Baggs is at the forefront of a movement that's forcing researchers to rethink autism.
Photo: Jessica Dimmock

FEATURE

A Researcher's Puzzles Point to the Differences in the Autistic Brain

The YouTube clip opens with a woman facing away from the camera, rocking back and forth, flapping her hands awkwardly, and emitting an eerie hum. She then performs strange repetitive behaviors: slapping a piece of paper against a window, running a hand lengthwise over a computer keyboard, twisting the knob of a drawer. She bats a necklace with her hand and nuzzles her face against the pages of a book. And you find yourself thinking: Who's shooting this footage of the handicapped lady, and why do I always get sucked into watching the latest viral video?

But then the words "A Translation" appear on a black screen, and for the next five minutes, 27-year-old Amanda Baggs — who is autistic and doesn't speak — describes in vivid and articulate terms what's going on inside her head as she carries out these seemingly bizarre actions. In a synthesized voice generated by a software application, she explains that touching, tasting, and smelling allow her to have a "constant conversation" with her surroundings. These forms of nonverbal stimuli constitute her "native language," Baggs explains, and are no better or worse than spoken language. Yet her failure to speak is seen as a deficit, she says, while other people's failure to learn her language is seen as natural and acceptable.

And you find yourself thinking: She might have a point.

In My Language

Baggs lives in a public housing project for the elderly and handicapped near downtown Burlington, Vermont. She has short black hair, a pointy nose, and round glasses. She usually wears a T-shirt and baggy pants, and she spends a scary amount of time — day and night — on the Internet: blogging, hanging out in Second Life, and corresponding with her autie and aspie friends. (For the uninitiated, that's *autistic* and *Asperger*'s.)

On a blustery afternoon, Baggs reclines on a red futon in the apartment of her neighbor (and best friend). She has a gray travel pillow wrapped around her neck, a keyboard resting on her lap, and a DynaVox VMax computer propped against her legs.

Like many people with autism, Baggs doesn't like to look you in the eye and needs help with tasks like preparing a meal and taking a shower. In conversation she'll occasionally grunt or sigh, but she stopped speaking altogether in her early twenties. Instead, she types 120 words a minute, which the DynaVox then translates into a synthesized female voice that sounds like a deadpan British schoolteacher.

The YouTube post, she says, was a political statement, designed to call attention to people's tendency to underestimate autistics. It wasn't her first video post, but this one took off. "When the number of viewers began to climb, I got scared out of my mind," Baggs says. As the hit count neared 100,000, her blog was flooded. At 200,000, scientists were inviting her to visit their labs. By 300,000, the TV people came calling, hearts warmed by the story of a young woman's fiery spirit and the rare glimpse into what has long been regarded as the solitary imprisonment of the autistic mind. "I've said a million times that I'm not trapped in my own world,'" Baggs says. "Yet what do most of these news stories lead with? Saying exactly that."

Photo: Jessica Dimmock

I tell her that I asked one of the world's leading authorities on autism to check out the video. The expert's opinion: Baggs must have had outside help creating it, perhaps from one of her caregivers. Her inability to talk, coupled with repetitive behaviors, lack of eye contact, and the need for assistance with everyday tasks are telltale signs of severe autism. Among all autistics, 75 percent are expected to score in the mentally retarded range on standard intelligence tests — that's an IQ of 70 or less.

People like Baggs fall at one end of an array of developmental syndromes known as autism spectrum disorders. The spectrum ranges from someone with severe disability and cognitive impairment to the socially awkward eccentric with Asperger's syndrome.

After I explain the scientist's doubts, Baggs grunts, and her mouth forms just a hint of a smirk as she lets loose a salvo on the keyboard. No one helped her shoot the video, edit it, and upload it to YouTube. She used a Sony Cybershot DSC-T1, a digital camera that can record up to 90 seconds of video (she has since upgraded). She then patched the footage together using the editing programs RAD Video Tools, VirtualDub, and DivXLand Media Subtitler. "My care provider wouldn't even know how to work the software," she says.

Baggs is part of an increasingly visible and highly networked community of autistics. Over the past decade, this group has benefited enormously from the Internet as well as innovations like type-to-speech software. Baggs may never have considered herself trapped in her own world, but thanks to technology, she can communicate with the same speed and specificity as someone using spoken language.

Photo: Jessica Dimmock

Autistics like Baggs are now leading a nascent civil rights movement. "I remember in '99," she says, "seeing a number of gay pride Web sites. I envied how many there were and wished there was something like that for autism. Now there is." The message: We're here. We're weird. Get used to it.

This movement is being fueled by a small but growing cadre of neuropsychological researchers who are taking a fresh look at the nature of autism itself. The condition, they say, shouldn't be thought of as a disease to be eradicated. It may be that the autistic brain is not defective but simply different — an example of the variety of human development. These researchers assert that the focus on finding a cure for autism — the disease model — has kept science from asking fundamental questions about how autistic brains function.

A cornerstone of this new approach — call it the difference model — is that past research about autistic intelligence is flawed, perhaps catastrophically so, because the instruments used to measure intelligence are bogus. "If Amanda Baggs had walked into my clinic five years ago," says Massachusetts General Hospital neuroscientist Thomas Zeffiro, one of the leading proponents of the difference model, "I would have said she was a low-functioning autistic with significant cognitive impairment. And I would have been totally wrong."

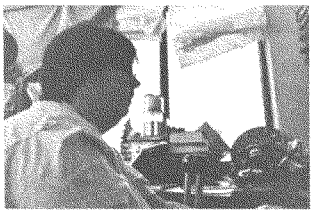


Photo: Jessica Dimmock

Seventy years ago, a Baltimore psychiatrist named Leo Kanner began recording observations about children in his clinic who exhibited "fascinating peculiarities." Just as Kanner's landmark paper was about to be published, a pediatrician in Vienna named Hans Asperger was putting the finishing touches on a report about a similar patient population. Both men, independently, used the same word to describe and define the condition: *autist*, or *autism*, from the Greek *autos*, meaning self.

The children had very real deficits, especially when it came to the "failure to be integrated in a social group" (Asperger) or the inborn inability to form "affective contact" with other people (Kanner). The two doctors' other observations about language impairment, repetitive behaviors, and the desire for sameness still form much of the basis of autism diagnoses in the 21st century.

On the matter of autistic intelligence, Kanner spoke of an array of mental skills, "islets of ability" — vocabulary, memory, and problem-solving that "bespeak good intelligence." Asperger, too, was struck by "a particular originality of thought and experience." Yet over the years, those islets attracted scientific interest only when they were amazing — savant-level capabilities in areas such as music, mathematics, and drawing. For the millions of people with autism who weren't savants, the general view was that their condition was tragic, their brainpower lacking.

The test typically used to substantiate this view relies heavily on language, social interaction, and cultural knowledge — areas that autistic people, by definition, find difficult. About six years ago, Meredyth Goldberg Edelson, a professor of psychology at Willamette University in Oregon, reviewed 215 articles published over the past 71 years, all making or referring to this link between autism and mental retardation. She found that most of the papers (74 percent) lacked their own research data to back up the assumption. Thirty-nine percent of the articles weren't based on any data, and even the more rigorous studies often used questionable measures of intelligence. "Are the majority of autistics mentally retarded?" Goldberg Edelson asks. "Personally, I don't think they are, but we don't have the data to answer that."

Mike Merzenich, a professor of neuroscience at UC San Francisco, says the notion that 75 percent of autistic people are mentally retarded is "incredibly wrong and destructive." He has worked with a number of autistic children, many of whom are nonverbal and would have been plunked into the low-functioning category. "We label them as retarded because they can't express what they know," and then, as they grow older, we accept that they "can't do much beyond sit in the back of a warehouse somewhere and stuff letters in envelopes."

The irony is that this dearth of data persists even as autism receives an avalanche of attention. Organizations such as Autism Speaks advocate for research and resources. Celebrity parents like Toni Braxton, Ed Asner, and Jenny McCarthy get high-profile coverage on talk shows and TV news magazines. Newsweeklies raise fears of an autism epidemic. But is there an epidemic? There's certainly the perception of one. According to the Centers for Disease Control, one out of every 150 8-year-old children (in the areas of the US most recently studied) has an autism spectrum disorder, a prevalence much higher than in decades past, when the rate was thought to be in the range of four or five cases per 10,000 children. But no one knows whether this apparent explosion of cases is due to an actual rise in autism, changing diagnostic criteria, inconsistent survey techniques, or some combination of the three.

In his original paper in 1943, Kanner wrote that while many of the children he examined "were at one

time or another looked upon as feebleminded, they are all unquestionably endowed with *good cognitive potentialities*." Sixty-five years later, though, little is known about those potentialities. As one researcher told me, "There's no money in the field for looking at differences" in the autistic brain. "But if you talk about trying to fix a problem — then the funding comes."

On the outskirts of Montreal sits a brick monolith, the Hôpital Rivière-des-Prairies. Once one of Canada's most notorious asylums, it now has a small number of resident psychiatric patients, but most of the space has been converted into clinics and research facilities.

One of the leading researchers here is Laurent Mottron, 55, a psychiatrist specializing in autism. Mottron, who grew up in postwar France, had a tough childhood. His family had a history of schizophrenia and Tourette syndrome, and he probably has what today would be diagnosed as attention deficit and hyperactivity disorder. Naturally, he went into psychiatry. By the early '80s, Mottron was doing clinical work at a school in Tours that catered to children with sensory impairment, including autism. "The view then," Mottron says, "was that these children could be reeled back to normalcy with play therapy and work on the parents' relationships" — a gentle way of saying that the parents, especially the mother, were to blame. (The theory that emotionally distant "refrigerator mothers" caused autism had by then been rejected in the US, but in France and many other countries, the view lingered.)

After only a few weeks on the job, Mottron decided the theories were crap. "These children were just of another kind," he says. "You couldn't turn someone autistic or make someone not autistic. It was hardwired." In 1986, Mottron began working with an autistic man who would later become known in the scientific literature as "E.C." A draftsman who specialized in mechanical drawings, E.C. had incredible savant skills in 3-D drawing. He could rotate objects in his mind and make technical drawings without the need for a single revision. After two years of working with E.C., Mottron made his second breakthrough — not about autistics this time but about the rest of us: People with standard-issue brains — so-called neurotypicals — don't have the perceptual abilities to do what E.C. could do. "It's just inconsistent with how our brains work," Mottron says.

From that day forward, he decided to challenge the disease model underlying most autism research. "I wanted to go as far as I could to show that their perception — their brains — are totally different." Not damaged. Not dysfunctional. Just different.

By the mid-1990s, Mottron was a faculty member at the University of Montreal, where he began publishing papers on "atypicalities of perception" in autistic subjects. When performing certain mental tasks — especially when tapping visual, spatial, and auditory functions — autistics have shown superior performance compared with neurotypicals. Call it the upside of autism. Dozens of studies — Mottron's and others — have demonstrated that people with autism spectrum disorder have a number of strengths: a higher prevalence of perfect pitch, enhanced ability with 3-D drawing and pattern recognition, more accurate graphic recall, and various superior memory skills.

Yet most scientists who come across these skills classify them as "anomalous peaks of ability," set them aside, and return to the questions that drive most research: What's wrong with the autistic brain? Can we find the genes responsible so that we can someday cure it? Is there a unifying theory of autism? With severe autistics, cognitive strengths are even more apt to be overlooked because these individuals have such obvious deficits and are so hard to test. People like Baggs don't speak, others may run out of the room, and still others might not be able to hold a pencil. And besides, if 75 percent of them are mentally retarded, well, why bother?

Mottron draws a parallel with homosexuality. Until 1974, psychiatry's bible, the *Diagnostic and Statistical Manual of Mental Disorders*, described being gay as a mental illness. Someday, Mottron says, we'll look back on today's ideas about autism with the same sense of shame that we now feel when talking about psychology's pre-1974 views on sexuality. "We want to break the idea that autism should definitely be suppressed," he says.

Michelle Dawson, right, is autistic. She's also a researcher in the lab of Laurent Mottron (left), a psychiatrist who specializes in autism.
Photo: Jessica Dimmock

Michelle Dawson doesn't drive or cook. Public transit overwhelms her, and face-to-face interaction is an ordeal. She was employed as a postal worker in 1998 when she "came out of the closet" with her diagnosis of autism, which she received in the early '90s. After that, she claims, Canada Post harassed her to such a degree that she was forced to take a permanent leave of absence, starting in 2002. (Canada Post says Dawson was treated fairly.) To fight back, she went on an information-devouring rampage. "There's such a variety of human behavior. Why is my kind wrong?" she asks. She eventually began scouring the libraries of McGill University in Montreal to delve into the autism literature. She searched out journal articles using the online catalog and sat on the floor reading studies among the stacks.

Dawson, like Baggs, has become a reluctant spokesperson for this new view of autism. Both are prolific bloggers and correspond constantly with scientists, parents' groups, medical institutions, the courts, journalists, and anyone else who'll listen to their stories of how autistics are mistreated. Baggs has been using YouTube to make her point; Dawson's weapon is science.

In 2001, Dawson contacted Mottron, figuring that his clinic might help improve the quality of her life. Mottron tried to give her some advice on navigating the neurotypical world, but his tips on how to handle banking, shopping, and buses didn't help. After meeting with her a few times, Mottron began to suspect that what Dawson really needed was a sense of purpose. In 2003, he handed her one of his in-progress journal articles and asked her to copy-edit the grammar. So Dawson started reading. "I criticized his science almost immediately," she says.

Encouraged by Dawson's interest, Mottron sent her other papers. She responded with written critiques of his work. Then one day in early 2003, she called with a question. "I asked: How did they control for attention in that fMRI face study?' That caught his attention." Dawson had flagged an error that Mottron says most postdocs would have missed. He was impressed, and over the next few months he sought Dawson's input on other technical questions. Eventually, he invited her to collaborate with his research

group, despite the fact that her only academic credential was a high school diploma.

Dawson has an incredible memory, but she's not a savant. What makes her unique, Mottron says, is her gift for scientific analysis — the way she can sniff through methodologies and statistical manipulation, hunting down tiny errors and weak links in logic.

Last summer, the peer-reviewed journal *Psychological Science* published a study titled "The Level and Nature of Autistic Intelligence." The lead author was Michelle Dawson. The paper argues that autistic smarts have been underestimated because the tools for assessing intelligence depend on techniques ill-suited to autistics. The researchers administered two different intelligence tests to 51 children and adults diagnosed with autism and to 43 non-autistic children and adults.

The first test, known as the Wechsler Intelligence Scale, has helped solidify the notion of peaks of ability amid otherwise pervasive mental retardation among autistics. The other test is Raven's Progressive Matrices, which requires neither a race against the clock nor a proctor breathing down your neck. The Raven is considered as reliable as the Wechsler, but the Wechsler is far more commonly used. Perhaps that's because it requires less effort for the average test taker. Raven measures abstract reasoning — "effortful" operations like spotting patterns or solving geometric puzzles. In contrast, much of the Wechsler assesses crystallized skills like acquired vocabulary, making correct change, or knowing that milk goes in the fridge and cereal in the cupboard — learned information that most people intuit or recall almost automatically.

What the researchers found was that while non-autistic subjects scored just about the same — a little above average — on both tests, the autistic group scored much better on the Raven. Two individuals' scores swung from the mentally retarded range to the 94th percentile. More significantly, the subset of autistic children in the study scored roughly 30 percentile points higher on the Raven than they did on the more language-dependent Wechsler, pulling all but a couple of them out of the range for mental retardation.

A number of scientists shrugged off the results — of course autistics would do better on nonverbal tests. But Dawson and her coauthors saw something more. The "peaks of ability" on the Wechsler correlated strongly with the average scores on the Raven. The finding suggests the Wechsler scores give only a glimpse of the autistics' intelligence, whereas the Raven — the gold standard of fluid intelligence testing — reveals the true, or at least truer, level of general intelligence.

Yet to a remarkable degree, scientists conducting cognitive evaluations continue to use tests which presume that people who can't communicate the answer don't know the answer. The question is: Why? Greg Allen, an assistant professor of psychiatry at University of Texas Southwestern Medical Center, says that although most researchers know the Wechsler doesn't provide a good assessment of people with autism, there's pressure to use the test anyway. "Say you're submitting a grant to study autistic people by comparing them to a control group," he says. "The first question that comes up is: Did you control for IQ? Matching people on IQ is meant to clean up the methodology, but I think it can also end up damaging the study."

And that hurts autistic people, Dawson says. She makes a comparison with blindness. Of course blind people have a disability and need special accommodation. But you wouldn't give a blind person a test heavily dependent on vision and interpret their poor score as an accurate measure of intelligence. Mottron is unequivocal: Because of recent research, especially the Raven paper, it's clearer than ever that so-called low-functioning people like Amanda Baggs are more intelligent than once presumed.The Dawson paper was hardly conclusive, but it generated buzz among scientists and the media. Mottron's team is now collaborating with Massachusetts General Hospital's Zeffiro, a neuroimaging expert, to dig deeper. Zeffiro and company are looking for variable types of mental processing *without* asking, what's wrong with this brain? Their first study compares fMRI results from autistic and control subjects whose brains were imaged while they performed the Raven test. The group is currently crunching numbers for publication, and the study looks both perplexing and promising.

Surprisingly, they didn't find any variability in which parts of the brain lit up when subjects performed the tasks. "We thought we'd see different patterns of activation," Zeffiro says, "but it looks like the similarities outweigh the dissimilarities." When they examined participants' Raven scores together with

response times, however, they noticed something odd. The two groups had the same error rates, but as an aggregate, the autistics completed the tasks 40 percent faster than the non-autistics. "They spent less time coming up with the same number of right answers. The only explanation we can see right now," Zeffiro says, is that autistic brains working on this set of tasks "seem to be engaged at a higher level of efficiency." That may have to do with greater connectivity within an area or areas of the brain. He and other researchers are already exploring this hypothesis using diffusion tensor imaging, which measures the density of brain wiring.

But critics of the difference model reject the whole idea that autism is merely another example of neuro-diversity. After all, being able to plan your meals for the week or ask for directions bespeak important forms of intelligence. "If you pretend the areas that are troubled aren't there, you miss important aspects of the person," says Fred Volkmar, director of Yale's Child Study Center.

In the vast majority of journal articles, autism is referred to as a disorder, and the majority of neuro-psychiatric experts will tell you that the description fits — something is wrong with the autistic brain. UCSF's Merzenich, who agrees that conventional intelligence-testing tools are misleading, still doesn't think the difference model makes sense. Many autistics are probably smarter than we think, he says. But there's little question that more severe autism is characterized by what Merzenich terms "grossly abnormal" brain development that can lead to a "catastrophic end state." Denying this reality, he says, is misguided. Yale's Volkmar likens it to telling a physically disabled person: "You don't need a wheelchair. Walk!"

Meanwhile parents, educators, and autism advocates worry that focusing on the latent abilities and intelligence of autistic people may eventually lead to cuts in funding both for research into a cure and services provided by government. As one mother of an autistic boy told me, "There's no question that my son needs treatment and a cure."

Back in Burlington, Baggs is cueing up another YouTube clip. She angles her computer screen so I can see it. Set to the soundtrack of Queen's "Under Pressure," it's a montage of close-up videos showing behaviors like pen clicking, thumb twiddling, and finger tapping. The message: Why are some stress-related behaviors socially permissible, while others — like the rocking bodies and flapping arms commonly associated with autism — are not? Hit count for the video at last check: 80,000 and climbing.

Should autism be treated? Yes, says Baggs, it should be treated with respect. "People aren't interested in us functioning with the brains we have," she says, because autism is considered to be outside the range of normal variability. "I don't fit the stereotype of autism. But who does?" she asks, hammering especially hard on the keyboard. "The definition of autism is so fluid and changing every few years." What's exciting, she says, is that Mottron and other scientists have "found universal strengths where others usually look for universal deficits." Neuro-cognitive science, she says, is finally catching up to what she and many other adults with autism have been saying all along.

Baggs is working on some new videos. One project is tentatively titled "Am I a Person Yet?" She'll explore communication, empathy, self-reflection — core elements of the human experience that have at times been used to define personhood itself. And at various points during the clip, she'll ask: "Am I a person yet?" It's a provocative idea, and you might find yourself thinking: She has a point.

David Wolman (david@david-wolman.com) *wrote about a terrorist attack response drill in issue 16.02.*

TIMES

From The Sunday Times

August 5, 2007

Virtual jihad hits Second Life website

Chris Gourlay and Abul Taher

Islamic militants are suspected of using Second Life, the internet virtual world, to hunt for recruits and mimic real-life terrorism.

Police and the intelligence services are concerned that it may have been infiltrated by extremists to proselytise, communicate and transfer money to one another. Radicals may also be responsible for "virtual" terrorist attacks in which buildings depicted on the website are blown up.

Kevin Zuccato, head of the Australian government's High Tech Crime Centre, said jihadists may also be using the virtual reality world to master skills such as reconnaissance and surveillance. "We need to start thinking about living, working and protecting two worlds and two realities," he told a security industry conference in Sydney.

The concerns are shared by Europol, the pan-European police agency, which believes that Second Life provides a means to transfer money across borders in a way that is more difficult for the authorities to monitor. It has recruited security consultants to advise on the use of Second Life for fraud and terrorism.

Of particular concern is the anonymity of Second Life members who can use false names for their digital personas, known as avatars, to disguise their real identity and provide false contact details in the real world.

Intelligence sources said that although communications traffic through Second Life could in theory be monitored, often the only means of tracking an individual is by tracing the user's IP address - the physical location of a computer in the real world - but even this can be faked. Monitoring complex money movements in the virtual world presents law enforcement agencies with further surveillance challenges.

Second Life, which has a global membership of more than 8.5m, uses three-dimensional graphics technology to create a virtual world. Anyone can become a member or "resident" for free and roam the virtual world after creating an avatar. They then meet and interact with other users' avatars, visiting shops, theatres and sports events, trading goods and services and having sex.

So popular has Second Life become that companies such as Sony, BMW and Reebok have bought "land" and opened premises there. Some governments, including that of Sweden, have opened virtual embassies in Second Life.

Recently, inhabitants of the virtual world have experienced a more sinister phenomenon - virtual terrorist attacks against buildings and avatars. A recent attack took place at the Australian Broadcasting Corporation's Second Life base. A number of these attacks, known as "griefings", have been launched by what industry insiders say are "geeky teenagers" giving themselves names such as the Second Life Liberation Army.

Some experts, however, believe the "virtual atrocities" may have been committed by real Islamic radicals. Rohan Gunaratna, a terrorism expert at the International Centre for Political Violence and Terrorism Research in Singapore, said that for the past three months he had monitored about 12 jihadists who have assumed identities in Second Life. He said they were mostly based in America and Europe.

Some radicals, he said, had given themselves "innocuous" titles, while others had provocative jihadist names such as Irhabi007 (Arabic for Terrorist007). Gunaratna acknowledged that not all Islamists had any intention of carrying out terrorist attacks in real life, but said that they were using Second Life to build a community of extremists.

"Even in the training camps of Afghanistan, less than 1% returned and committed terrorist acts," said Gunaratna.

Second Life has its own currency, the Linden dollar, named after the company behind the virtual reality world. About 250 Linden dollars are equivalent to one US dollar and residents can buy the currency from the company to trade in Second Life.

Linden Lab said that about $1m (£490,000) a day was exchanged in Second Life.

Linden, which has a team monitoring financial transactions in Second Life, said it was not aware of any money being exchanged by jihadists, but could not rule out the possibility.

Europol and the British Serious Organised Crime Agency (Soca) are concerned that Second Life provides an ideal facility for criminals to launder money through in-world enterprises such as casinos. There are fears that terrorists could also take advantage of difficulties in policing Linden dollar movements to transfer funds between operatives around the world.

A Soca source said the agency was looking at ways to address illicit financial activity in the virtual world.

The source added that policing the movement of money in Second Life presents challenges, as funds may be transferred across borders.

Mark Johnson, chairman of Risk Management Group, a British agency that advises Europol on fraud and terrorism in Second Life, said: "The critical issue with terrorist funding cases is trying to detect money movements prior to the commission of the crime. So if you can move money around in secret in an environment where there is little surveillance, it is a very sensitive point."

John Zdanowski, chief financial officer at Linden, said the company strictly monitored the exchange of money in Second Life. So far, he added, there had not been any suspicious transaction where the company had called in the police or the FBI.

Linden also said that it was unaware of any extremists using Second Life.

Terror Spotters

CCTV cameras capable of spotting criminals and known terrorist suspects through facial recognition technology are set to be deployed at Euston railway station in London, *writes Dipesh Gadher*.

The cameras are likely to monitor passengers coming through ticket barriers in order to get a "fix" on their faces. The captured images will be cross-referenced against photographs of criminals.

Sources claim this will initially involve identifying minor offenders, such as pickpockets. Once installed, the technology could also be used with a security service database of terrorist suspects.

Euston already has a network of digital CCTV cameras that should be able to run facial recognition software.

The technology - based on two-dimensional images, or possibly 3-D ones for greater accuracy - is being developed by biometrics experts at the National Policing Improvement Agency.

The trial, which could take place later this year, is part of a wider clampdown on security at key transport hubs.

The July 7 suicide bombers were captured on CCTV as they travelled to London on the Thameslink rail service from Luton. At least two of the attackers had previously been monitored and photographed by the authorities.

STATEMENT OF THE AMERICAN CANCER SOCIETY

PREPARED BY RANDALL MOSS

The American Cancer Society is the nationwide community-based voluntary health organization dedicated to eliminating cancer as a major health problem by preventing cancer, saving lives, and diminishing suffering from cancer, through research, education, advocacy, and service. One of the key activities of the American Cancer Society is organizing people to deliver on the mission of the Society. As a community-based volunteer organization, we have a responsibility to seek out communities and engage them in mission related activities.

The Futuring and Innovation Center (FIC) is charged with the exploration and investigation of outlying trends that may impact our organization and our constituents. We proactively seek out trends by way of reading futures-oriented periodicals, attending conferences, and engaging thought leaders directly in order to develop scenarios. From these scenarios we make strategic suggestions on areas of opportunity to drive mission to new and existing communities and better service our constituents.

In 2003, we identified an upcoming trend that suggested a substantial move towards online communities. The early 2000s saw an increased adoption of broadband as well as new software technology and less expensive mass memory storage and processor power. Along with the advent of Friendster, MySpace, and Facebook, the Futuring and Innovation Center also saw the development of 3D immersive virtual world environments. In April 2004, at the Association of Professional Futurists annual meeting, Philip Rosedale of Linden Lab introduced Mike Mitchell and me to Second Life.

Looking beyond the technology, we clearly saw the foundation of this virtual world was a global community of people. Beyond the circuits and servers, the core of the emerging trend was a rebirth of community in a digital space. The Second Life community at the time was barely 50,000 active members, and the Futuring and Innovation Center believed the combined growth in computational technology and broadband adoption would increase the membership of Second Life and other virtual communities exponentially.

What drew the Society to become involved in Second Life was the potential for in-depth constituent interaction. The platform allows for a rich visual experience, and we predicted correctly that it would very shortly support rich audio and voice interactions. The technology also supports the importation of images and text, as well as a monetary system that allows for financial transactions. After considering the capabilities of Second Life, we recognized it as a platform that would support the Society's mission related activities.

The Society's initial activity in Second Life was a replication of our signature fundraising event, Relay For Life. The American Cancer Society Relay For Life began in May 1985, when a colorectal surgeon ran around a track in Tacoma, Washington for 24 hours, raising $27,000 to support the American Cancer Society. Relay For Life has raised more than $1.5 billion to support the Society and accelerate the progress in the war against cancer by saving lives, helping those touched by cancer, and empowering people to fight back against this disease.

The Futuring and Innovation Center worked with the American Cancer Society volunteers in Second Life to create a virtual space large enough to hold a full fledged 24-hour walk-a-thon. The goal of this event was to determine the capacity of a virtual world platform to hold a re-creation of a real world event. The event attracted hundreds of residents to walk and to donate money to support the mission. The Society reached out through the community members to advertise the relay, attracting well over 500 people to attend and walk in the first annual Relay For Life in Second Life. The event was designed and built by a core of seven (7) volunteers, who created a 96-square-acre park. The fundraising results were just over $5,000. Of this, approximately $1,000 came from direct credit card donations and $4,000 came from Linden Dollar donations. After the event, it was evident that fundraising and mission delivery were absolutely achievable in a virtual world community.

Following the success of the initial event, we began to consider the options of how to further expand our mission delivery capabilities. The Society attracted a number of volunteers after the 2005 event who donated their skill, dedication, and volunteer hours to develop the 2006 Relay For Life in Second Life. The 2006 Relay was twice as large, covering 192 square acres, and had an official theme: "Cancer Around the World." Each section of the track was built and decorated to reflect the countries where Second Life residents live in the real world. The countries represented included India, Ireland, China, South Africa, Australia, and Mexico. The 2006 Second

Life Relay for Life fundraising totaled $41,000, of which nearly $4,000 was collected from credit card payments, and $37,000 was collected in Linden dollars. This was the first year the Society encouraged team fundraising as an extraordinary way to mobilize the community and draw attendees. The volume of participants was higher than expected, numbering over 1,200, and even resulted in a temporary shut down of the Second Life server due to so many people trying to participate in the Relay.

The financial and participation successes of the 2006 Relay For Life drew additional volunteers who were excited to help design, manage and execute the 2007 event. During the 2007 Relay planning, we transitioned volunteer leadership from our original volunteer chair to a new volunteer chair who had been involved closely in the planning of the 2006 event. Our new chair expanded the scope and size of the Relay by increasing the physical space to 512 square acres. The volunteer committee also limited the number of teams that could participate to 40, and community leaders filled all 40 team slots. The volunteer committee named the Relay "Quest For a Cure," and the group of 20 worked for 13 days to create adventure themed landscapes and experience scenes to line the track. The event drew over 1,700 walkers and raised $118,500, with $117,985 coming from Linden Dollar donations.

More importantly, the Second Life members issued a call to the Society for supportive services and health content from the Society. In accordance with the wishes of the community, the Society initiated a program to create an office and a resource center located on what is today called "American Cancer Society Island." The Society's goals are to translate real-life patient support services into the virtual space as identically as possible. By considering Second Life to be both a self-contained and an extension of real world community, we appreciate the fact that there are cancer survivors, patients, and care givers here who did not have access to, or had not accessed, our services previously and can benefit from them.

With the constituent experience in mind, the Society developed the American Cancer Society Island in conjunction with the development company IVM, who did the work pro bono. The centerpiece of the island is a set of interactive educational experiences. The first element is a set of virtual computer terminals that, when engaged, ask the constituent direct questions about the type of cancer information they are seeking. The interface leads them through a decision tree. The end result is a Web browser opening on the constituent's screen with a Cancer.org page containing the information they want. At this time, the interface functions only in English, but as we are looking to add additional languages to Cancer.org, we will update the Second Life interface to follow suit.

The second piece of our education mission is a theater. The space is equipped with a slide projector for group meetings and presentations. To maintain professional standards, only Society staff members are permitted to present medical information on the American Cancer Society Island. We have invited and scheduled medical professionals to present on nutrition, medical research, and epidemiology studies. Along with Society staff, various members of the Second Life community make presentations on their personal experience with cancer. A number of community-led support groups have developed, and the Society encourages them to use our space and resources for their meetings.

The final piece of our educational activities is in development. The Society is creating interactive tutorials intended to help individuals learn the physical motions to conduct cancer self-examinations. First in line are tutorials for breast cancer and the Reach to Recovery program. Using the interactive nature of Second Life, we are creating a series of action scripts that will "take control" of a resident's avatar and manipulate the avatar in an exact replication of the motions necessary to complete a breast self-examination. We also are working on a series of motion scripts that lead the avatar through a series of movements that coincide with our "Reach to Recovery" program. Reach to Recovery is a comprehensive program designed to help newly diagnosed patients and recovering breast cancer survivors improve their quality of life. The movements are designed specifically to build the strength in the chest muscles, particularly important for women who have had breast cancer operations. To complement the tutorial, we are investigating the possibility of training Second Life volunteers to undertake the counseling side of Reach to Recovery.

This October, the Society launched our Making Strides Against Breast Cancer program in Second Life. It is an initial effort designed to highlight October as Breast Cancer Awareness Month, with numerous small awareness rallies and educational sessions. We hope to attract volunteers and supporters to future events, where we will be holding educational and community support activities. The backbone of all American Cancer Society programs is that the community must want the program and support it.

Future plans at the office include expanded Society support programs, as well as additional informational resources in the form of uploaded brochures and the most recent reports. With the advent of voice communication to Second Life, the Society is seeking ways to link Second Life constituents directly to our National Cancer Information Center, a 24/7 toll free call center. We also hope to collaborate with other international cancer organizations to expand our resources and capacity.

The American Cancer Society is active in Second Life because it recognizes Virtual Communities as communities of caring individuals not unlike any city or town anywhere else in the world. We appreciate the unique nature of the platform and its abilities to bring together a global population. As cancer is a world issue, it makes solid business sense for us to engage this community by offering as many services as we can and replicating our fundraising programs to support our efforts. The American Cancer Society is successful in Second Life because we know that without our volunteer support, we would not be able to execute our mission delivery activities. We appreciate the efforts of our volunteers and thank them for all of their hard work and dedication. Together we can win the battle against cancer.