Volume 2, Number 3
Technology, Economy, and Standards.

Community
Creation
Commerce

Artwork by Anshe Chung Studios

Volume 2, Number 3
Technology, Economy, and Standards
October 2009

Sponsored in part by:

The Journal of Virtual Worlds Research is owned and published by:

TEXAS DIGITAL LIBRARY

department of RADIOTELEVISIONFILM
UNIVERSITY OF TEXAS AT AUSTIN

SIRC THE SINGAPORE iNTERNET RESEARCH CENTRE
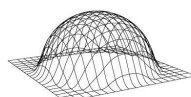
virtual worlds research consortium

Editor's Corner

Overview: State of Virtual Worlds Standards in 2009

By Yesha Sivan,
Shenkar College of Engineering, Design & Metaverse Labs. Ltd.

Abstract

This paper serves as an introduction to the special issue of the Journal of Virtual Worlds Research on Technology, Economy, and Standards. It starts with a set of assumptions about the nature of virtual worlds, their potential, and the role of standards play within them. The second section includes a more detailed discussion about the definition of virtual worlds (as an integration of four factors of 3D, Community, Creation, and Commerce, aka 3D3C). The third section covers a general framework for standards: the five dimensions standards (Level, Purpose, Effect, Sponsor, Stage) as well as a reflective discussion about the origin and value of such a framework. The forth section connects standards with virtual worlds, advocating a stacked approach to standards and components. The sixth section includes a review of, and an invitation to read, the papers in this issue.

Keywords: virtual worlds; 3D3C; dimensions of standards; MPEG-V.

Editor's Corner
Overview: State of Virtual Worlds Standards in 2009
By Yesha Sivan,
Shenkar College of Engineering, Design & Metaverse Labs. Ltd.

As a fast introduction to the topic of "standards for virtual worlds," imagine you are a shirt designer, and then consider these four questions:

1. Can I really make money by selling virtual shirts to my friends?
2. When can I make money by selling virtual shirts to my friends?
3. What needs to occur before I can make money from selling shirts?
4. What specific standards do we need to allow me to make money from selling shirts?

The first question is about the **nature of virtual worlds**. It is a general question asked by many as they first hear about virtual worlds. The idea of making real money from selling virtual items is daunting—almost scary. Yet, this idea of virtual goods is usually a low hurdle. Examples like virtual music (you buy a virtual song in iTunes), virtual movies (you rent a movie from Netflix), and paying a subscription for games (like World of Warcraft), really make the idea of virtual shirts very concrete as goods that are digital in nature and are not tangible. In fact, we are surrounded by virtual goods in the form of services or digital products. What's more, many of the real products that we make, or get, include virtual components (consider mobile phone where the cost of the physical telephone is relatively low compared to the cost of the services we get). And this is only the beginning; the potential for virtual worlds in health, entertainment, learning, and many other fields is immense.

The second question is about **timing**. Once you appreciate the potential of virtual worlds and the potential benefits in a variety of fields, it is natural to ponder when this potential will become reality. This is an important question for people who want to use virtual worlds for real results (that is beyond test, experimentation, pilot, proof of concept, etc.) The adoption of full virtual worlds such as Second Life is a good example. I estimate that by mid-2009 we have about one million users visiting Second Life at least once a month. Many of them (I estimate 200,000) will probably spend about a few hours a week. However, compared with web based experiences like Twitter, Facebook, or LinkedIn these are small numbers (FaceBook reached 300 million users just recently). Currently, churn is major challenge: many people try virtual worlds, very few stay. People are excited to start, but simply do not stay or continue to gain value from virtual worlds. We are clearly just starting.

The third question is about the **missing components**. If the potential of virtual worlds is big, yet current use is limited, what components we need to move forward? What barriers prevent users from using virtual worlds effectively, and what barriers prevent organizations from using virtual worlds? The answer is probably a combination of factors—mostly technological, some social. To expand, we need server power, client power, bandwidth, and easier interfaces. We need users that can overcome the interfaces and move to engage in virtual worlds, as well as organizations, and creators that know how to create virtual worlds engagements for these users.

The fourth question focuses on **one key answer: Standards**. The claim of the forth question is that standards are a (if not "the") key for the long term prosperity of virtual worlds. Successful media of the past like the telephone, the television, mobile phones, and of course the

internet, are all based on standards. Virtual worlds, as a new medium, will also need to be based on common standards.

The search for the right standards, along with the work of establishing them, evolving them, and causing their adoption, is a long term effort. Behind common media we always have standards doing their regulatory work. The internet, web and mobile phones are all supported by behind-the-scenes teams that worry, care, argue, fight, bribe, beg and smile to arrive at common standards. The works of IETF, W3C, and GSM teams (the main organizations that manage the internet, web, and mobile industries respectively) is full of exotic meeting sites, endless documents writing, balloting, and lots of acronyms like TCP/IP, XML, and 3G.

This special issue of the Journal of Virtual Worlds Research is part of the effort to explore the fields of standards for virtual worlds. Working on such standards is a process that is both a technical and conceptual. At the risk of being too technical, let me share one helpful example. Last year (2008), as part of a call for technical inputs, I have received numerous inputs, specifically from Sun Wonderland (https://lg3d-wonderland.dev.java.net/), Web3d (http://web3d.org/), Openmetaverse (http://www.openmetaverse.org/), and various business people in virtual worlds ("merchants"). Following some more inputs I also had to look more closely at various building blocks such as OpenID (http://openid.net/) and Collada (http://www.collada.org). Such players, terms, technologies and agendas are part of the background. As we delved further, we were able to identify many good practical and theoretical endeavors. Such endeavors enhance, explicate, and analyze various aspects of standards and virtual worlds. We were looking to establish a stage for these efforts, and as a result, this special issue was born.

The Journal of Virtual Worlds, founded by Jeremiah Spencer, has established itself as a leading authority in the field. By focusing solely on virtual worlds, it was able to assemble latest research, theory, and practice pertaining to this relatively unexplored area of enterprise and thought. Past issues dealt with Virtual Worlds Research: Past, Present & Future; Consumer Behavior in Virtual Worlds; Cultures of Virtual Worlds; Pedagogy, Education and Innovation in Virtual Worlds; and 3D Virtual Worlds for Health and Healthcare. The potential of virtual worlds is engagingly described on the virtual pages of the journal.

This issue was designed to give voice to leading theoretical and practical players working in the realm of standards. We specifically chose to emphasize the disciplines of economy and technology as critical harbingers to the endeavor of standards. Together with my co-editors Robert Bloomfield (from the Johnson Graduate School of Management at Cornell University) and Jean H.A. Gelissen, (from Philips Research), we looked to explicate some of the deeper corners of the field. In our call (http://www.metaverse-labs.com/tes), we invited, and received, scholarship pertaining to topics such as:

- Specific standards or families of standards that can impact virtual worlds
- Economic analysis of specific standards for specific firms
- Discussion on Privacy, Authentication, and related issues (for example Open ID)
- Legal aspects of virtual worlds that can be set in the technical specifications
- Review of relevant technology platforms—along with their pros and their cons
- Case studies of large scale standardization efforts (Windows, Linux, GSM) and the lessons learned from them that can be applied to the development of virtual worlds
- Visions of the virtual world's universal access system (network and station)

- Comparing related terms such as working code, for and not for profit efforts, open sources, and formal systems
- Key places where standards matter (looking for the mouse and windows of virtual worlds), in other words the interfaces with the real (physical) world
- Economic analysis of various externalities in the field
- Winning stories of standards in the field (be it private, public, open, etc)
- Example of wrong standards, failed standards, and other things to learn from
- Short Term Winnings (VRML) vs. Long Term Value
- Evaluation of whether we need to add to current standards so that they will be used in virtual worlds (ISBN 3D, OpenID3D, etc.)
- The impact of open standards on close systems (Android); the impact of propriety technology (iPhone)
- The connection between various legal formats (GPL, LGPL) and new technologies (i.e., Grid/cloud for virtual worlds)

As editors we specifically encouraged short papers on specific examples (past, present, or future). We asked the authors to assume the readers will be well-versed in various aspects of virtual worlds, but not necessarily economy, technology or standards.

Thinking about standards for virtual worlds is a daunting task. The goal of the issue is to present possible methods of thinking, rather than construct an exhaustive review of standards. There are many forces at work in this area—many competing technologies, business models, and personal, corporate and public interests. However, our goal for this issue is modest: to enhance and deepen the discussion about standards for virtual worlds.

Let's establish a few assumptions for this issue as we have shared them with the authors:

1. **Virtual worlds are destined to become "big**." That is, *big* in the sense of meaningful, influential, and lucrative for various current and new players. Every aspect of our lives will be affected by virtual worlds. Beyond being simply another media, virtual worlds will be part of our regular lives, and they are going to enhance, improve, and better our quality of life. Much like the internet, virtual worlds will allow us to do "traditional" things more effectively, and try out entirely new things as well.

2. *Real virtual worlds are defined as an integration of four factors (AKA 3D3C)*, This is a 3D view of the world, Community, Creation, and Commerce (AKA 3D3C). The more we have of these factors the closer we get to real virtual worlds. In that sense IMVU, Second Life, and Entropia are more real virtual worlds than Club Penguin, World of Warcraft, and SIMS on-line. This preliminary perspective ("3D3C") to virtual worlds will be covered in the second section of this introduction paper.

3. **"Standards" as a concept and mechanism are often misunderstood**. People often link standards with competing concepts: open and free on the one hand and propriety patents, limitation of creativity on the other. Like many other human constructs, standards are not inherently good or bad – what you do with a standard gives them their positive or negative value. One overarching framework to standards called "the five dimensions of standards" will be covered in the third section of this paper.

4. **A stacked approach is better then a monolith approach**. Currently the virtual worlds industry operates more like the Computer Gaming Industry than like the internet industry. Each developer, be it private (e.g., Linden, Forterra) an open source (e.g., Sun Darkstar, OpenSim) develops their own server, client, and rules of engagement. The inherent rationale of these efforts is a combination of "we know best" and "we will conquer the world." While this may be the case (see Microsoft Windows, Apple iPod, or Google search), I believe the common public good calls for a connected system like the internet, where different forces can innovate in particular spots of the value chain. I will be happy if one firm or organization succeed to capture the virtual worlds market and allow it to blossom (MS-Windows, for example, facilitated the entire PC industry, Google is now doing it for Grid computing, and Apple has is destined to our relations with mobile devices). Yet, I think, the virtual world market is too complex and long term in nature for one firm. Thus a more inclusive model (like the internet) may be more appropriate. The call for stacked approach is developed further in the forth section of the paper.

5. **Market today (2009): many Players, one leader**. There are many players in the field – all with various goals and takes on the field. Some of these players may have a direct and meaningful contribution to make. Currently the Open-Second Life ecosystem has potential to turn into the standard. The co-operation between Linden and Open source work seems to advance the state of the art. Yet, some voices look at this endeavor as Linden's attempt (planned or not planned) to stall the larger goal of standards. Standards are not always about technical value; they are more often about business models. I have asked the Second Life's founder and de-facto leader (also known as god of gods) to share his perspective on standards and the world of Second Life.

6. **My personal take.** This work is part of an effort to build a community around standards for virtual worlds. I have started this work with the EU based Metaverse1 consortium which includes about 30 organizations mostly based in Europe to set "global standards between real and virtual worlds." This work will feed into the MPEG-V (Moving Picture Experts Group Virtual Worlds Standard). The MPEG group is part of the International Standards Organization (ISO). This starting point will be covered by Jean Gelissen in his paper about the MPEG-V effort.

7. **We are just starting.** The efforts to develop standards for virtual worlds are just starting. It will take time. At this point, we are defining the path. We have a long way to go.

We now move to the expanded definition to virtual worlds.

Introduction to Virtual Worlds: Integrating 3D3C

Virtual worlds are an emerging medium that is constantly creeping into our lives. Following the success of such gaming worlds as World of Warcraft, The Sims and others, terms like 3D, avatars, chat and real money are rising. For individuals, new forms of interactive entertainment, mostly social, are also pushing virtual worlds. For the enterprise, the drive to save travel costs and the need to gain new customers and retain current ones push this trend even further (Murugensan, 2008).

I maintain that real virtual worlds will, eventually, offer a paradigm shift. What we see now with Second Life, World of Warcraft, Club Penguin and more then 100 other worlds, is just the beginning. In comparison to the Internet age, we are at the "Gopher" stage (Gopher was a pre-browser method to view hyperlinked data).

This budding arena of real virtual worlds has its roots in two fields: virtual reality (Burda & Coiffet, 2003) including augmented reality (Bimber & Raskar, 2005) and gaming worlds (Bartle, 2004; Alexander, 2003; Alexander, 2005; Taylor, 2006). Other related fields also affecting virtual worlds include but are not limited to economy (for example, of virtual goods), sociology (nature of communities), law (copyrights and ownership), biology (new brain based human-computer interfaces), computer science (performance, reliability and scalability) and mathematics (algorithms for 3D rendering and animation).

I use the adjective "real" to distinguish between virtual worlds and gaming worlds. "Real" implies a potential reaching further than imagined today . While today's virtual worlds are clearly used mostly for fun and games, real virtual worlds have the capacity to alter our lives. (Note: for the sake of brevity, I will onward use virtual worlds or simply worlds.)

I define real virtual worlds as an aggregate of four factors:

A 3D World – A three dimensional representation, that is viewable from various perspectives, it is active, and reactive.

In a virtual world viewers can see objects like avatars, houses, and cars. The world has land, a sky, a sun (maybe more than one), wind, gravity, water, and fire. Avatars move around freely, and the user can examine the world from different points of view. Further, the world is active (including moving objects), and reactive (objects can act in a similar way as they do in the physical world).

1. **Community – Set of tools that allow communities to operate (including groups, sub groups, permissions, leadership, friends, etc).** Virtual worlds allow users, via their avatars, to meet, chat, shop, watch performances, hang out with friends, team up to fight bad guys, go clubbing ... in other words, to interact in countless ways. Within "community," I include related concepts such as groups, permissions, rights, and roles.
2. **Creation – Set of tools that allow users to create in-world, or import content from the real world. Creation includes actions such as arranging, creating, re-purposing, and performing. Creation refers to both objects and services.** Second Life's (SL) greatest technological achievement was giving users the capability to develop their own objects in world interactively. Users can simply move preconstructed objects from one place to another (say, to furnish a home or set up a nightclub), or they may assemble an object (e.g., a house) from basic components, such as walls and ceilings, and then "paint" them with various textures. SL's programming language, Linden Script Language, even allows users to program behavioral attributes for their objects, so that fish can swim in schools, golf balls can arc through the air, guns can shoot, and people can dance (as the script activates the animation).
3. **Commerce – The ability to connect with real money, including payment, transfer of funds from one object/player to another, and facility to transfer money between the virtual world to the real world.** As an example, SL's maker, Linden Lab, has created the Linden Dollar (L$), which has a defined exchange rate with the US dollar

(one US$ fluctuates around L$260). This L$ currency is the base for the economy of SL. You can exchange L$ to US$ immediately and at any time at the Linden Exchange. For instance, if you earn L$2,600 from tips, you could exchange them for about US$10, which would be immediately transferred to your real PayPal or bank account. Going the other way, if you need L$5,200 for a new car, you could immediately buy them for about US$20.

Ultimately, real virtual worlds arise from the **integration** of **3D**, **Community**, **Creation** and **Commerce**. SL reveals the emergence of this integration (and thus I, like others, use this specific world as the primary example of virtual worlds). In SL you will find prices for objects, permissions (i.e., an object may be restricted from being sold), and ownerships. Commerce is embedded into the world. For example, let us assume that we enjoy Beth's singing (Beth is a real world singer that performs from time to time in SL) and wish to tip her. We point to her and transfer money by clicking a button. If Beth wants to buy a new blouse, she goes to a shop, points to the blouse of her choice and buys it for L$2,000. The blouse is as a unique object in this world, and Beth will not be able to copy it. The shopkeeper will receive L$500 for the blouse, and the blouse manufacturer will receive L$1,500 (in accordance with a previously defined business agreement between them). At the end of the month, the shopkeeper will pay rent to the landowners, also based on a predetermined agreement.

Second Life is not the only virtual world with a thriving "real" economy. The Entropia Universe also has a cash-based economy (with a fixed rate of 10 "PED" to one US$), and its maker, MindArk PE AB, has even received preliminary approval for an actual banking license by the Swedish Finance Supervisory. This would allow its users to conduct real-world banking transactions from within the Entropia Universe. (Thompson, 2009). IMVU is another example.

This integration of a 3D world, organized and managed communities, immediate creation capabilities of objects and services, and a virtual commerce which actually becomes real, is the basic allure of SL in particular and of real virtual worlds in general

Introduction to Standards: The Five Dimensions

From Industrial Age to Knowledge Age Standards

Almost every aspect of our life is supported and often shaped by standards. Consider, for example, the work you are now reading. It has a table of contents (a common standard for quick access); it has page numbers (another quick access device); it uses a standard language, a standard font, and a standard paper size. In the making of this work, both directly and indirectly, I have used dozens of other standards, among them: the Postscript page description language, the Internet, the Harvard online library system, the QWERTY keyboard, the Microsoft Word program, and many more.

Assume that you are sitting in a typical kitchen of a typical home anywhere in the industrialized world. Look around you. All electrical appliances share the same electric current. You need a fan? Move it from another room, plug it in, and enjoy the cool breeze. Want some music? No problem; grab any CD and a CD player, put the CD in the player, press "play," and enjoy the sounds. Notice that you can take any CD from any vendor and replay it in any other CD

player, anywhere in the world (legal standards, burned into a technical standards, will not allow you to do so with DVDs, given that that have regions).

Assume that you are in a car. Look around you. First and foremost you are face with the issue of fuel, which you can get in any fuel station down the street. Look at your tires. You can choose any kind, as long as they match the standard specifications of your car. Consider the plate number, registration, and mandated insurance, or the traffic signs, directional lights, emission standards, and the radio. All involve some standards.

What were the roles standards played in the industrial age? Well, as the above examples suggest, standards played diverse roles. One researcher suggested the following laundry list:

> A standard is a formulation established verbally, in writing or by any other graphical method, or by means of a model, sample, or other physical means of representation, to serve during a certain period of time for defining, designing or specifying certain features of a unit or basis of measurement, a physical object, an action, a process, a method, a practice, a capacity, a function, a duty, a right, a responsibility, a behavior, an attitude, a concept or a conception, or a combination of these, with the object of promoting economy and efficiency in production, disposal, regulation and/or utilization of goods and services, by providing a common ground of understanding among producers, dealers, consumers, users, technologists and other groups concerned (Verman, 1973 and the original Gaillard, 1934).

While comprehensive, this list has no zest, charm, or appeal. Such a definition often deters people because it does not provoke them in any meaningful way. What I needed personally, and what I felt others need in order to embrace the concept of standards, is a strong evocative image that will capture the critical facets of the phenomenon of standards.

To grasp fully the scale of the change in the roles of standards, one must grasp the changing nature of standards themselves in the last 2-3 decades—a change that will be intensified in the years to come. The standardization community, which includes the private, national, and international bodies that produced the standards in the industrial age, has to adapt itself to the new roles of standards in the knowledge age.

For example, the International Standards Organization (ISO), in their report *A Vision for the Future: Standards Needs for Emerging Technologies* (1990), claims that traditional industrial-age innovation followed the linear sequence from scientific discovery to applied research and development, followed by production and marketing. This linear sequence, according to the ISO, "must now be seen as a series of concurrent interactive processes." As a result, the report calls for structural changes in the setting of international standards. This means that while in the industrial age one first created a product and then standardized it, in the knowledge age one often needs the standards before the products. Also, in many cases, especially in information technology industries, compatibility with previous standards is a necessary condition even to enter the market.

In another example, the U.S. Congressional Office of Technology Assessment (OTA), in its report *Global Standards: Building Blocks for the Future* (1992), claims that the "emergence of a global economy in which the United States no longer plays the predominant role" will call for more and different global standardization. The report also discusses other aspects of standards

in the knowledge age, such as the growth of international standardization efforts and the effect of multinational organizations.

IT related standardization is shifting. The recent (2008) spat between IBM led OpenDoc and Microsoft ECMA OpenXML (Blind, 2008) has exposed – again – the tension that this process generates. I assume that tension means value. In that regard see IBM Standards on Standards provide a good overview to the lasted industry unease with the process.

The rise of the open source processes, including strong competing players, calls for more transparency and web tools to build standards. Therefore, the sheer complexity of knowledge based standards is a mounting challenge.

Origin and Nature of the Dimensions Framework

Before I could actually start developing the framework (for the full discussion see Sivan, 2000), I had to figure out a good format for it. Luckily, early in my journey, I found what seemed to be a good candidate. This format was published in Lal Verman's 1973 seminal work *Standardization: A New Discipline*. In his book, Verman, who was the Director General of the Indian Standards Institute from 1947 to 1955, proposed a three-dimensional standardization space as a "logical means of presenting standardization."

Verman's approach to mapping the concept of standards can be best demonstrated by using a simplified example. Suppose we want to understand the concept of "shirts," as discussed earlier. According to Verman, we first have to find the three major dimensions, or attributes, of shirts. For the sake of the example, let's say that these are the dimensions of color (categories include: black, white, red, yellow, and blue), kind (categories include: fun shirt, work shirt, evening shirt), and size (categories include: small, medium, and large). Then, following Verman, we arrange these dimensions in a three-dimensional space. Each point in the space represents a potential question that one can ask about shirts. For example, who uses a black, long-sleeved, fun shirt? Or, what can we say about work shirts in terms of color or kind? (Note that the dimensions generate questions and not answers.)

Verman himself explained that the three-dimensional space should not be taken in its strict mathematical sense, but more as a way to look systematically at the phenomenon of standards. He also suggested adding more dimensions, which go beyond the spatial representation of the three dimensions. To continue with our shirts example, we can add, as a fourth dimension, the shape of the shirt (categories include: long sleeves, short sleeves, has buttons, has pockets).

In general, frameworks like the one proposed by Verman, which attempt to classify a concept systematically, are often used to create a shared map for a concept. Like other maps, they model a complex concept by capturing some of its important dimensions. Their main purpose is to "serve as instruments of understanding," which they achieve by highlighting the critical dimensions of the land. As with the other frameworks, models, and maps, which assist in describing and analyzing their respective domains, a framework of standards should create a common vocabulary, and thus assist in describing and analyzing the domain of standards.

The preliminary research also raised again the inherent pitfalls of such a framework. Like all maps, a dimensional framework has limitations. Not only can it highlight only parts of the terrain, it may also distort some of the terrain's features. Like the blue line on a map that marks a

river that may be dry, certain dimensions that the framework describes in a particular way may look quite different in the real world. In the same way that it is not possible to capture the true color of every river, it is impossible to capture the actual meaning of each dimension in the real world. After all, a map is just a map, and it is not the actual land (Kent, 1978).

The Five Dimensions

The principal result of this work is a framework for standards, which has five dimensions. Each dimension has five categories, which together explicate the dimension.

Table 1: Summary of the Five Dimensions of Standards

Dimension 1: Level	Dimension 2: Purpose	Dimension 3: Effect	Dimension 4: Sponsor	Dimension 5: Stage
Individual	Simplification	Constructive	Devoid	Missing
Organizational	Communication	Positive	Nonsponsored	Emerging
Associational	Harmonization	Unknown	Unsponsored	Existing
National	Protection	Negative	Multisponsored	Declining
Multinational	Valuation	Destructive	Mandated	Dying

Source: Sivan, 2000 Box 5.2 – "Summary of the Five Dimensions"

The framework can be best illustrated by showing how the five dimensions work in a real context. So, for the purpose of this overview, I would like to give you a taste of the framework. I'm well aware that at this point some of the categories probably look cryptic (i.e., Harmonization) or even totally unclear (i.e., Unsponsored). Still, even at this early stage, I believe it is possible — and important — to give you a taste of the generality, utility, and potential value of the framework.

Our goal in this overview is to taste the nature and value of the framework while acknowledging these yet-to-be-explained categories. I say "our" and "we" because you, the reader, will also have an active part in this overview. Together, by me asking questions and you giving answers, we will examine the five dimensions of the framework by applying it to a concrete example.

First, I ask you to spend a few seconds selecting a standard that particularly interests you. You can use any of the standards that I have presented in the introduction or ones that you see or would like to see around you. You can choose the cable standard (say its short name is "Cable"), the standards for computer based characters ("ASCII"), the structure and size of credit cards ("Credit card"), tests like the Scholastic Aptitude Tests ("SAT"), or the fact that you need a tie in some restaurants ("Tie-in-a-restaurant"). Better yet, you may want to select a standard from your own setting. (You don't have to spend too much time. In talks I have given about standards, I found that the first thing that comes into your mind will usually suffice.)

In any case, make sure that you have a name for the standard, preferably a short name (up to four words is best). Then, in the following paragraphs, we will use the framework together to ponder about the Level, Purpose, Effect, Sponsor, and Stage of your standard.

The Level dimension will prompt us to think about the users and producers of the standard. For example, if you chose the SAT standard, then the users are students (Level-individual) and universities (Level-organizational), and the producer, one in this case, is the Educational Testing Service (Level-organizational). Who uses your standard? Is it used by individuals, organizations, or even nations or the entire world? Was it developed by one of the international bodies, or perhaps by an association of companies? Or was developed by a particular person?

The Purpose dimension will prompt us to think about the aims, both intended and actual, of standards. For example, the "Tie-in-a-restaurant" standard is aimed at maintaining a respectful clientele and protecting those who want to get their money's worth in terms of ambiance (Purpose-protection). What about your standard? Perhaps it was originally intended just to create vocabulary, or perhaps it was intended to protect consumers from potential harm. Some standards, and yours may be among them, were originally designed to support simplification, but later they were used to support protection.

The Effect dimension will prompt us to consider the pros and cons, the benefits and problems, and the payoffs and tradeoffs that standards have. If you chose the Cable standard, then a payoff would be the diverse channels that we can now enjoy (Effect-positive) and the tradeoff would be the monopolistic system that the cable industry operates in (Effect-negative). What about your standard? For example, it may currently have positive Effects on one organization, but long-term negative, and perhaps even destructive, Effects on another organization. Or just the opposite; it may have negative Effects now, but constructive Effects in the future. We may also find that we know basically nothing about the Effects of your standard.

The Sponsor dimension will prompt us to consider the origin of the standard. In the case of the credit card size, the sponsor is the International Standards Organization (Sponsor-multisponsor). Who developed your standard? Can you identify it? Was it a single entity that is making lots of money off it? Or perhaps a not-for-profit coalition of many organizations? Is it a standard with a punishment attached to it, or just a recommendation?

The Stage dimension will prompt us to think about the process of making the standard. For example, the ASCII standard is well established (Stage-existing), although there is some discussion about a extending ASCII to include non-Romance languages (like Arabic and Hebrew). What about your standard? Does it already exist? Is it widely used by many people? Perhaps its use is already declining, as its negative Effects overcome its positive Effects?

The above brief mental experiment should give you a taste of the framework's working. In essence, the five dimensions act as mental prisms. Like real prisms, which are used to break down and analyze light into its basic colors, the dimensions can be used to break down and analyze an object into its basic components. The object in question can be a particular standard, a setting, a view, or some other target of analysis that involves standards.

In some cases, with certain objects, several categories or even whole dimensions will not be applicable. Yet, by having all five dimensions in our mental arsenal, we equip ourselves with a general tool. The price of this generality is the lack of applicability of some of the dimensions to some cases. This may explain why, in the above mental experiment, you might have found that particular dimensions did not relate to your selected standard.

Aimed with the framework, we can now turn to examine the potential of standards when it comes to virtual worlds, and specifically their role in enabling innovation:

The Promise of Standards for 3D3C Virtual Worlds: In Praise of the Stacked Approach

I just got new 3D goggles (Vuzix iWear VR920 3D goggles for $400). This relatively inexpensive device allows you to view a virtual world by simply turning your head around. When you look up, you see the sky, when you look down you see your legs (your avatar's legs). When the item arrived, I had to install a special driver for Second Life. Even then, it did not work with the latest version of Second Life – which means an older version had to be installed (not a simple task if Second Life has mandated the latest version). Furthermore, it did not work with IMVU nor with Sun's Darkstar/wanderland.

In contrast, almost any computer screen that you connect to a computer works. Any mouse works by simply plugging it in. Standards mean better connectivity, ease of use (no need to install, follow versions etc.) More so, standards mean more users will buy the 3D goggles and prices could go down to perhaps $200 or $100. Once standards are common, maybe other firms will find it lucrative to go in – thus raising competition, lowering cost and gaining features and quality (which may not such good news for Vuzix).

This is the most important value of standards: Standards allow innovation in specific points of the value chain—innovation that we need if we want to arrive the full potential of virtual worlds.

Often, the first example that comes to mind talking about to virtual worlds standards is the concept of "Travatar", an avatar that allows you to travel from one world to another. The discussion about Travatars that travel from Second Life to World of Warcraft and back is hiding a much deeper issue. What I want is one avatar (maybe 2 or 3 avatars), all mine, all walking in worlds that share the same basic interface, basic creation tools, basic friends list, and basic commercial system. I want to use the money I make from selling songs in Second Life to buy space to hold meetings in Qwaq. I want to build a sword in Second Life and use it in World of Warcraft. I want the same sword to be used in a rehabilitation treatment for Parkinson patients.

Standards do not mean uniformity. In the same manner that we have specialized web sites (Amazon, eBay, and YouTube) we will have special firms that deal with specific aspects of virtual worlds. These firms will compete on speed, cost, quality, service, and features. They could decide what to focus on. At this point all the firms have to develop all components – they all develop avatar technology, access, servers, clients, etc. The market is not efficient.

Could you imagine having to use a different browser each time you need to go to eBay, or Amazon or CNN? People will not even start using the internet. This is the current case with virtual worlds. It is no wonder that Second Life, at one time, had 1 million new users a month – only to keep less than 5000 of them 6 months later? (I'm being generous here).

Today virtual worlds use the **monolith approach** model. This model works for the gaming worlds (World of Warcraft, etc.). Each gaming firm develops its own stack. By controlling the client, the server and the rules of the world, the gaming firm used to gain value in terms of game play. In contrast, the Internet has a **stacked approach** with protocols (e.g., HTML, TCP/IP, DNS, Flash).

One key benefit to a stacked approach is enhancing "innovation points." Each actor in the field can focus on specific points of the chain and innovate. One challenge: virtual worlds are much more complex than the internet (x 100) and more intertwined (avatars needs to wear clothing in different islands and still communicate with their friends).

Delving Into the Details

The papers in this issue look at the state of standards for virtual worlds via four points of view: **Technology**, **Economy**, **Standards**, and **Use Cases**. After reading this introduction, which sets the scene for all papers (authors were specifically asked to minimize introductory definitions and reviews), the reader could start exploring the issue from any point of view. My preferred perspective starts with specific technologies that facilitate healthy economies that lead to "good" standards, which in turn lead to valuable use cases.

The *Technology* point of view demonstrates specific examples to places where standards are needed:

- Philip Rosedale reflects in his short paper "**Virtual Worlds, Collaboratively Built**" on the process and intention of past, current and future Second Life.

- Alex Juarez, Christoph Bartneck, and Lou Feijs, discuss "**Standards for Interaction Between Robots and Virtual Worlds**." They propose: creating a standard platform that enable the seamless interaction between these heterogeneous, distributed devices and systems.

- Sigurd Van Broeck, Mark Van den Broeck and Zhe Lou, discuss "**Content Level Gateway for Virtual Worlds.**" They propose a solution to guard virtual worlds from counterproductive content in the form of 3D models, avatars, textures, animations, or any other type of content commonly used by virtual worlds.

- Samuel Cruz-Lara, Nadia Bellalem, Lotfi Bellalem and Tarik Osswald, discuss in their paper **"Immersive 3D Environments and Multilinguality"** some Non-Intrusive and Dynamic e-learning-oriented Scenarios based on Textual Information. Their paper includes a review of some of the leading standards for localization.

- Jordi Janer, Nathaniel Finney, Gerard Roma, Stefan Kersten, and Xavier Serra discuss "**Soundscape**" aiming to framework under for the automatic sonification of virtual worlds.

- Jon Watte presents his perspective to the development of virtual worlds: **"Let Use Cases Drive Design."** His main claim: "serious" virtual worlds will be the initial market that drives true virtual world interoperability because of its particular needs.

The *Economic* point of view demonstrates diverse angles to virtual worlds:

- Tuukka Lehtiniemi, discusses **"Measuring Aggregate Production"** of virtual worlds. He proposes the concept of GUP (Gross User Product), with concrete data from EVE Online extensive log data collected by the operator.

- Evan W. Osborne and Shu Z. Schiller, discuss **"Order and Creativity"** in virtual worlds. Guided by the economic modeling of order and creativity, they discuss two types of behavior, constructive and destructive, to provide some guidelines for establishing limitations on the freedom of action of virtual-economy participants.

- Markus Falk, Daniel M Besemann, and James Bosson discuss **"Payback of Mining Activities"** focusing on the payback of mining activities within the virtual world Entropia.

- Ray op'tLand discusses **"World of Warcraft, AOL, and the Disneyization of a Niche Market."** The main trust is to look at virtual worlds (such as WOW), using the process of Disneyization, as proposed by Bryman (2004), occurs within four dimensions: theming, hybrid consumption, merchandising, and performativity.

The *Standards* point of view focuses on specific aspects of standards in general and in virtual worlds:

- Kai Jakobs cover in depth, in his seminal paper **"Real Standards for Virtual Worlds - Why and How?"** the necessary background to those who would like to pro-actively participate in the setting of standards for Information and Communication Technologies.

- Marco Otte and Johan Hoorn, in their paper **"Prevention of False Hope and Undue Fear"** propose standards to measure people's hopes and fears during online transactions and connect this to a decision support system that estimates the probability that the user's expectations are right. They use theory development through the reconciliation of technology acceptance, hope formation literature, risk perception and problem solving.

- Melissa de Zwart, in her paper **"Piracy vs. Control: Models of Virtual World Governance and Their Impact on Player and User Experience,"** claim that current models of governance of virtual worlds evolved from the Terms of Service developed by the virtual world content creators based upon intellectual property license models. Increasingly, however, virtual world providers now seek to accommodate both the needs and interests of owners and users in order to respond to the evolving needs of the virtual world.

- Blagica Jovanova, Marius Preda, and Françoise Preteux discuss **"The Role of Interoperability in Virtual Worlds, via the Analysis of the Specific Cases of Avatars."** They provide a detailed survey of research for avatar appearance modeling, deformation control, and animation.

- In a related work, Gustav Verhulsdonck and Jacquelyn Morie, discuss in their short paper **"Virtual Chironomia"** the need for Non-verbal Communication Standards in Virtual Worlds.

- Jean H. A. Gelissen, a co-editor of this issue, presents a short review of **"MPEG-V."** MPEG-V (Media Context and Control), ISO/IEC 23005 is a new effort under ISO in the MPEG Working Group, the exact label is ISO/IEC JTC 1/SC 29/WG 11. MPEG is a deadline driven process (final deadline for MPEG-V is Oct, 2010 for publication of the ISO International Standard, IS).

- Lastly, in a sharp and valuable critique, D. Linda Garcia and Garrison LeMasters, in their paper **"Synthetic Excellence: Standards, Play, and Unintended Outcomes"** provide us with some critical view about standardization of virtual worlds, with a special focus on MPEG-V. Their main point: "This [MPEG-V] is an alarming trend, which could give rise to a number of unfortunate and unforeseen consequences."

The *Use Case* point of view demonstrates specific cases where standards are needed.

- Will Farr, Piet Hut, Jeff Ames, and Adam Johnson describe their "**Experiment in Scientific Visualization of Self-Gravitating Systems."** They push to identity what should be defined as parameters of virtual worlds (e.g., Gravity), as well as what does it mean to "store" an experiment in virtual worlds.

- Alice Krueger, Ann Ludwig, and David Ludwig, in their short paper **"Universal Design: Including Everyone in Virtual World Design"** challenge us to think about accessibility design within virtual worlds. Clearly, this is a place where standards could make a real difference.

- Ludvaig Lindman (Real-Avatar®), one of the most creative content makers in Second Life, describes his **"Virtual World Experiences"** as a business person in virtual worlds.

- Anna Salmasi and Lee Gillam, in their paper "**EthiCasino: Machine Ethics for Gambling in the Metaverse**" discuss the combined legal and ethical issues of gambling online and in virtual worlds, and discuss the construction and evaluation of a system with computational oversight: an ethical advisor.

- ArminasX Saiman (Real-Avatar®), a leading business owner in Second Life, shares with us his reflection on **"Barriers to Efficient Virtual Business Transactions."** The author has owned and operated such a virtual business for over two years, beginning from sales of a single virtual product on a web-based sales service in 2006, growing to a large in-world operation selling over 200 unique products today.

- Robert Bloomfield, a co-editor of this issue, sketches the features required of a platform, **"World of Bizcraft,"** that supports virtual worlds dedicated to research and education on business-related topics. His discussion leads to some advance features that could really benefit real virtual business and not just "research and education."

I want to thank the authors (real and real-avatar®) for sharing their ideas about virtual worlds technology, economy and standards. They demonstrate the global interest and diverse contributions needed for this endeavor. Special thanks to my co-editors of the issue Robert Bloomfield and Jean Gelissen, as well as the Journal team Jeremiah Spence and Andrea Muñoz. I look forward to advance standards for virtual worlds, with them – and with you – so that we can all enjoy richer, safer, and more powerful virtual worlds sooner.

Bibliography

Alexander, R. (2003). Massively multiplayer game development. Hingham, MA: Charles River Media, Inc.

Alexander, R. (2005). Massively multiplayer game development 2. Hingham, MA: Charles River Media, Inc.

Bartle, A. (2004). Designing Virtual Worlds. Berkeley, CA: New Riders Publishing.

Bimber, O., & Raskar R. (2005). Spatial augmented reality: Merging real and virtual worlds. Wellesley, MA: A K Peters.

Blind K. (2008). A Welfare Analysis of Standards Competition: The Example of the ECMA OpenXML Standard and the ISO ODF Standard. Paper submitted to the 6th ZEW Conference on the Economics of Information and Communication Technologies.

Burdea, G., & Coiffet P. (2003). Virtual reality technology. Hoboken, NJ: John Wiley & Sons.

Gaillard, John (1934). Industrial standardization: Its principles and application. New York, NY: H. W. Wilson Company

http://www.dryesha.com/2008/10/virtual-worlds-sos-q3-2008-state-of.html (11 October, 2008)

http://www.research.ibm.com//files/standards_wikis.shtml (Retrieved 11 October, 2008)

Interactive processes of innovation: International organization for standardization [ISO] (1990). A vision for the future: Standards needs for emerging technologies. Geneva, Switzerland: ISO.

Kent, William (1978). Data and reality: Basic assumptions in data processing reconsidered. New York, NY: North-Holland.

Murugensan, S., (Ed.) (2008). Finding the real world value in virtual. Cutter IT Journal for Information Technology Management, 21 (9).

Office Open XML. (2008). In Wikipedia, The Free Encyclopedia. Retrieved 8 November, 2008, from http://en.wikipedia.org/w/index.php?title=Office_Open_XML&oldid=250256848

OpenDocument. (2008). In Wikipedia, The Free Encyclopedia. Retrieved 8 November, 2008, from http://en.wikipedia.org/w/index.php?title=OpenDocument&oldid=250404349

Perkins, David N. (1986). Knowledge as design. Hillsdale, NJ: L. Erlbaum Associates. (p.126)

Report on global standardization: Office of Technology Assessment [OTA] (1992). Global standards: Building blocks for the future. Washington, DC: OTA.

Sivan, Y. (2008). "3D3C real virtual worlds defined: The immense potential of merging 3D, community, creation, and commerce." Journal of Virtual Worlds Research, 1 (1).

Sivan, Y. (2000). Knowledge age standards: A brief introduction to their dimensions. In K. Jakobs (Ed.), IT standards and standardization: A global perspective. Hershey, Pa: Idea Group Publishing.

Taylor, T. (2006). Play between worlds: Exploring online game culture. Cambridge, MA: MIT Press.

Thompson, M. (2009). "Real banking coming to virtual worlds." Ars Technica, 20 March 2009 (http://arstechnica.com/gaming/news/2009/03/real-banking-coming-to-virtual-worlds.ars).

Verman, Lal Chand (1973). Standardization: A new discipline. Hamden, CT: Archon Books.