WHAT THE WORLD NEEDS FROM EDUCATION:

Eight billion unique, symbiotic human hybrids constantly adding value to their world.

We can make it happen.

By Marc Prensky

[4,500 words]

"Two things the world will never run out of are problems to tackle, and unique people who can potentially tackle them. People, In the future, will increasingly mean newly empowered symbiotic human hybrids who can, as individuals and teams, apply the strength of their unique blends of human and technology components to creating new and positive value and solutions to local and global problems."

"The big issue for the world is not to create more or new jobs, but to figure out effective ways for people to be compensated for whatever series of world-improving projects they want to and choose to do."

– Marc Prensky

Roughly a quarter century ago young humans In many parts of the world began the transformation into what I called "digital natives." Not, as some wrongly assumed, because they were suddenly magically able to wisely use all the new technological capabilities and connections appearing in their palms and in pockets. Rather, because they were the first humans to be born into the new digital age – where powerful, new technologies were expanding and connecting them at never-before-known rates.

Not only were the technologies changing, but, as the kids' capabilities and connections expanded, their attitudes began to change as well. Sociologists began to observe shifting attitudes not just toward technology, but with regard with regard to Privacy, Property, Personal Relationships, Security, Sexuality, Power, Kids, Violence, God, Religion, Justice, Money, Love, Government, and even Time and Space. A new concept of "agency"– that kids can take actions to improve their world even at early ages – began to rise its head.

Two decades later, we are starting to experience the results – and they are substantial. Tech power has grown exponentially. Generational attitudes have evolved rapidly and radically (although not necessarily homogenously) all over the world. Kids have begun, in more and more places, to do meaningful projects with real-world impact, moving beyond the "toy PBL" of the last decades. (See btwdatabase.org.) Many now see this as only the beginning of radical civilizational and societal evolution humans are beginning to experience.

Do we want this?

For many adults today, this is incredibly disconcerting. We are seeing a large anti-technology-integration reaction emerge, as changes in our kids and in ourselves begin bothering more and more people. We hear more and more cries from adults for "turning off technology," and "preserving our humanity" – obviously with deep fears about losing it.

We see more and more adults who were expecting to be in control of their adult lives and world becoming frightened – frightened of their own kids, frightened of the future. It is a fear far more substantial than was the case in the many generational changes of the past. And their fears are hardly calmed when they read about – and see in films and videos – people portrayed as "cyborgs", with all the dystopian connotations that term carries.

I believe we can more accurately describe what is happening in terms that are far less frightening (although perhaps no less provocative): Today people everywhere, at different, but always accelerating rates, and at every age and level, are on their way to becoming what I call "SYMBIOTIC HUMAN HYBRIDS".

In some places this symbiosis is now obvious: perhaps a majority of humans in the so-called "developed world" have already delegated substantial parts of what they do to technology. China is becoming cashless as most payments – even small ones – are made electronically though smartphones. Our kids spend more and more time playing and texting on their screens, often not communicating face-to-face unless forced to. Leaving home without our cell phone can leave many of us struggling to get through the day. And even the world's poorest people are increasingly using mobile phones, micro-

lending, geo-location, genetically Improved crop yields, and other beneficial technologies, incorporating these technologies symbiotically into their lives.

"Tools" or "Symbiosis"?

I have been hearing in my recent conversations and discussions a deep attitudinal rift emerging in adult views on technology – one that's more subtle than just whether technology is "good or bad." Many of the people I talk to consider technology to be a set of "tools" – quite separate from humans, and either enhancing or competing with us — tools that may, or may not "take over" our lives and livelihoods. I, along with many others, see things differently. We see technology and humans becoming *integrated* in a new, emerging way – into what I call a new "symbiotic hybrid human."

Of these two perspectives regarding humans and technology, I believe it is the integration perspective, not the tool perspective, that is by far the better way to look at what is happening. The view of seeing humans on one side and technology on the other is extremely detrimental – to us, but far more importantly to our kids. Evolution has always been the right solution for humans. Things that begin as external tools (e.g. clothing) gradually become indispensable parts of us. Denying such progress, even to preserve something we like and value, has rarely been a good solution. It sets up battles we are bound to lose.

So, unless you think that humans have already reached their peak, I believe it is more useful to think about humans and machines as evolving, often by fits and starts, into a new state of "symbiotic hybridism" that will take us to new levels, than it is to think about new "tools" that can be used for good or bad. This is, for example, the way I recommend we look at our kids and their phones. We can always discuss what we think is better for them to do or not do on the phones, but the fact that they resist so strongly having the technology taken away from them is to me a sign not of addiction, as some claim, but of their growing symbiosis. If we do take their tech away, as many are doing, they will not die – the symbiosis is not complete – but how well will they fit their current and future world?

Symbiosis with technology – i.e. tools becoming indispensable parts of us – is, of course, the story of human development. The question of what we keep in our human heads (i.e. our dreams, passions, compassion, warmth, kindness, good, ethical behavior) and what we delegate to our extensions (e.g. calculation, memory, speed, accuracy, analysis, connection) has been a human issue since the invention of the abacus and writing. Today this integration is speeding up incredibly.

Finding new evolving integration opportunities – and realizing them seamlessly – is perhaps the most crucial task for humans in the coming years and centuries. It is what will lead to the solutions of all our pressing problems, which neither technology alone,

nor humans unintegrated with it, will be able to fully deal with. Helping each individual find his or her unique, appropriate and ideal "style" of hybrid symbiosis is perhaps the central challenge of future education. And yet, no one has adequately addressed the issue in those terms.

"How to produce the most effective symbiotic human hybrids" is the key civilization-level educational question we need to be looking out for and influencing.

How we wind up viewing and distributing our human capabilities (and potential) has enormous implications for what gets done in the world, and how we live our lives. The more we use our technology side, the more we can accomplish. But leaving out the "human," "soulful" side diminishes our satisfaction with our accomplishments. The more we choose to keep in our heads, the harder it is to put it all there and keep it in. The more we make "education" about accomplishments we choose, and not just "learning," the easier it becomes to educate.

Education needn't be hard – certainly not as hard as we have made it. I believe what the world sees as "education" can get better, easier, and far more universal, with just a "flip" in our understanding about what "education" means and what "a good education" is.

What is "an education"?

For the past several hundred years, most have seen an education as a set of content or curricula that we try to put into our kids' heads in order to make them into the people we want them to be. "Going through the curriculum" is certainly what education is today for most kids (with "covering the curriculum" as teaching.) In my experience, very few kids truly enjoy this (certainly not my 13-year-old son, who goes to one of the "best" public schools in California and complains daily about how much he dislikes it.) The reason for this dislike is – or should be – obvious: although this kind of education might take some kids where ADULTS want them to go, it hardly ever takes kids where THEY want to go.

For me, rather, "education" is whatever process takes a person from one state of capabilities to another (ideally from a less capable state to a more capable state.) Being educated, for me, is BECOMING ABLE TO ACCOMPLISH POSITIVE THINGS IN THE WORLD. It is becoming more capable of GETTING THINGS DONE. Education is NOT just "learning," although learning is a useful co- or by-product of accomplishment. By this definition, everyone in the world gets some kind of education– whether formal or informal. We want to make it the best one possible.

Our current "academic" system of education, developed over millennia and perfected over the last several centuries – and that almost countries offer most kids today – is not

the only system of education the world has produced. We also have an accomplishment-based education – parent to child, master to apprentice – that goes back much farther. The issue we face today is that our academic education no longer works well for the majority of the students who receive it. More and more agree that, no matter how much we may tweak it with technology, 21st-century skills, or anything else, it is not the right education for today's – and all of our kids' – future. Although academic education will no doubt continue in parts of the world for many, that "knowledge and skills-based" kind of education has already essentially been taken over by the relatively simple technology of You Tube (with hundreds of EdTech start-ups trying to extend this in their own way.) Almost all "content" is already on the web.

Time for Something New?

Given all the changes in our kids' capabilities and attitudes, and given that almost all content is now online, isn't it time for humanity to create a useful alternative to the now-failing-for-most system that we now call "education" – a more useful alternative for us all?

The existing system Is extremely resilient to change, and people who have been trying to "reform" it, anywhere, have become extremely frustrated. Education will probably never change everywhere or for everyone – but it is time to start providing alternatives for those people who see things, and want to do things, differently. The good news is that a better alternative for educating a great many of our kids is already emerging. It exists in pockets. And It works. In fact, it can work for almost everybody. We can call it "Real-world Impact Empowerment Education, "Education for Accomplishment" or the "Accomplishment Track" (or something else.) But what we need to do now is to encourage it.

Our Kids Are Not Pets

In our academic education we have pretty much opted to treat our kids like pets. Today we tell our kids where to go, what to do, how to sit, what to practice, what to learn and even when they can go to the bathroom, gradually giving them more freedom as they comply. We teach them tricks and then ask them to "roll over" and perform them on tests. The kids who comply best are literally named "teachers' pets." This view of kids is still what dominates our schools (and many of our homes as well.)

Partly, this is partly because, up until now, people couldn't accomplish much before becoming adults. Kids couldn't do very much without being exploited, which is why many places created child labor laws. So treating our kids as pets worked in recent times – it worked for many of us (today's adults.) But it does not work in the digital age, because the digital age empowers kids. Suddenly – and not gradually at all – our kids have devices in their hands with which they can, potentially, make big changes and get

really important things done. Empowered kids have extended minds, all networked together. This makes our current and future generations of kids completely different from any kids before. They can no longer be usefully seen as pets for us to control. Yet we really have no idea what to do with our kids' new capabilities, because this has never before been the case. We are just beginning the process of figuring out how to deal with this, and we certainly can't do it without the kids.

As adult educators, our first instinct has been to apply these new capabilities to doing what we have done before – i.e. to learning the traditional subjects of math, language, science, social studies. Unfortunately, this does not work very well. (We've already wasted billions of dollars creating useless EdTech to prove that it doesn't.) Another adult instinct is to "teach the technology" to our kids. That doesn't work either – the kids are too far ahead. We really have no clue, as yet, of the best, and right way to take real advantage of our kids extended minds and networking.

Our kids, however, have been out experimenting and exploring on their own. They quickly found that, just as with many new human capabilities in the past, the first new uses of a powerful technology are for amusement. Games have dominated their attention from the beginning.

But gradually, other powerful underlying capabilities of these new human-technology enhancements are coming out. A huge one, of course, is connection – kids now connect with their peers in all sorts of new ways and play most games in teams. These new connections are incredibly exciting for kids, and they are loath to go back to a less connected – or differently connected – past.

Of course, nothing is completely rosy and positive. Kids will often sleep-deprive themselves in order to keep their connections going. Individuals with a penchant for doing harm (bullying and worse) often find new connections can make it easier. (Technology has always been thus – much of it comes out of war, and if you have a desire to do harm, technology can be very helpful.) We are certainly far from where we'd like to be and, I think, will be in the long run. One might even reasonably argue that today not very much positive for humanity has so far come out of our new technology connections. Facebook has connected 1/3 of the planet, but look at all the growing pains we are having with it.

Yet bear in mind that we are only a few short years into having these capabilities. I believe that as we get considerably more experience with being connected, much will change. Humanity is in a great, quickly progressing experiment in moving forward in the newly connected world. Already the next stage has arrived for many of our kids. They have gone from being "born" digital natives to becoming – consciously and unconsciously – "extended minds all networked together." This is a far more powerful state than humans, and particularly young humans, have ever known.

Very sadly for them, our current education hardly takes this new reality into account at all. But it could – and soon will, I believe. Because another stage in our kids' – and human – development is quickly arriving. Very soon – much sooner than most think – our kids will become, and be, true "symbiotic hybrid" Individuals and teams. Their powers of accomplishment will increase dramatically, along with our increased understanding of traditional human characteristics such as dreams, empathy, passion and compassion. These people will no longer see themselves in the way many adults see themselves today: i.e. as humans (mostly good) enhanced with technology tools (some good, some bad). Rather, our kids will be, and identify as, new symbiotic hybrids with both biological and technical components, to be used together, powerfully and hopefully positively, in everything they do, from the earliest ages.

This transformation will happen quickly. It will probably take less than decades for many, certainly no longer than a generation for all. We will almost all be, within all of today's kids' lifetimes, symbiotic human hybrids.

Certainly, we will need to address many issues that are already arising. But I, unlike some, see this as a much more positive state for kids, and for humanity than the state we are currently in. It is our new symbiotic hybrid state that will finally allow us to solve humanity's hardest problems, from food, to global warming, to overpopulation. Yet even these new symbiotic hybrid people will need to get along, which is why we will, hopefully, never completely lose our "humanity." But by far our biggest challenge as educators is moving all our kids – and as many others as possible – to this new state of "symbiotic hybridism" as quickly as possible.

A New Goal and Challenge

This is also, in my view, the biggest challenge facing all of humanity in the next decades and centuries. Don't you think it's important to help our kids with this? Whether or not you personally like the idea of becoming symbiotic with technology, do you seriously think that in the next 10 to 20 years all the successful people on the planet will not be hybrids? In fact, a great many of them already are.

And, because anything that two people can do equally well can, and will, soon be automated, in order to thrive and meet the needs and demands of the future not only will each of us need to become a symbiotic hybrid, but each of our symbiotic hybrid selves will need to be UNIQUE. In an automated world, the unique will be only things left to add and create new value. This is actually enormously positive news for humanity, because every one of the approximately eight billion people on our planet is unique. First, in his or her unique combination of dreams, passions strengths and interests, and now, as they become symbiotic hybrids, unique in terms of how they integrate their new technology features. Up until now, we have undervalued our

uniqueness as individuals, but I believe this will change. With eight billion unique symbiotic human hybrids, **we can build a new civilization and world.**

So the new goal and challenge for every person in the world going forward is for to each become a good, effective, world-improving, unique symbiotic hybrid, who can getting useful positive projects done by working in teams to add and create new value in the world. Of course, they will not *know* this is their new goal unless we tell them – and the best, and right, place to do that is education. Education is not just the process where we pass down humanity's past – it is where we create our future.

I strongly believe that every person in the world – no matter their background – is capable of becoming a good, effective, world-improving, unique symbiotic hybrid who can work in teams to add and create new value in the world by getting useful positive projects done – thus creating our positive future. It is true for all our kids and for our adults as well. I believe that helping all of them get there is precisely what future education should be – and could be – about. That is why education never stops, throughout our life.

The Emerging Alternative Track

How do we create an education system – for kids and adults – that produces unique, symbiotic hybrid people who are good, effective and world improving? What kind of education will get us there? Answering that question is precisely the world's future educational challenge –and the answer is now becoming clearer, as a new alternative for educating our kids emerges bottom-up in the world. The kind of education that our kids – and everybody – needs in order to prepare them for the future is

Continuously completing, with good coaching,
Real-world-Impact projects, from the very start.

That this new system is emerging doesn't mean that we have to completely replace the old, academic system. But we do need to provide an alternative. Learning for its own sake – the academic ideal – is fine for some, but not for all. Accomplishment is what gets useful things done in the world, and a far better goal for most education is Real-world-Impact Accomplishment – the education tradition that has been kept alive in our workplaces. As Thomas Carlyle said in the 18th century, "nothing builds self-esteem and self-confidence like accomplishment." And, according to one IBMer, "the best predictor of future accomplishment is past accomplishment." This is not "vocational" education. It is an education that can be used for anything.

Real-World-Impact Projects

I often hear people say that “half (or some made-up number) of the jobs of the future haven't been invented yet." But the underlying point – and the point of education – is that we need to prepare people to do anything. The movement in the world seems to be away from "jobs" (in the industrial sense of something you learn and then do forever for a salary,) toward projects, where you join a team for a limited time to get something done, as in the movie business. An HR person at IBM recently said "We don't even do job descriptions anymore. We only do project descriptions." Projects are what's coming, and we know, as a species, how to do them – projects have been getting done since the dawn of man. What we need today is less to understand what the jobs of the future will be and more to do better at giving people the tools that allow individuals, in teams, to do whatever projects come up. If every person on our planet gets better at organizing, participating in, and getting projects done, the world will be a much better place. Project skills and experience is truly what a universal world education should be – everything else is specific to a person, place or time. As we learn new and better ways to do small and large projects effectively, we have to communicate these to everyone.

The world movement away from “jobs” towards projects has always been the case in some industries, like making motion pictures. Some see large parts of the economy moving to "gigs"– no longer confined to musicians, but in many professions, from consulting to graphic arts. As work gets re-defined as “creating and adding value for a customer,” each customer can be viewed as a separate project.

This development is extremely positive for humanity, even though it will require some serious reframing of what we now call work. “Jobs” often require extensive, specific preparation and training. Projects, on the other hand, require a set of very generalizable skills that can apply to any job. Anybody, anywhere, can be shown, helped, and coached, to get a project done. Marshall Goldstein, one of the world’s top business coaches recently said that he views each of his coaching assignments as a project. Project skills – which are now becoming clearer and better defined – can be learned at any age with positive coaching. Useful, real-world-impacting projects can be done by kids in kindergarten, middle school, high school, universities, and by people at any level from rag pickers to rocket scientists in any part of the world.

What’s Needed

Key elements for project success are a certain basic organization and framework (several exist), and, perhaps more importantly, that the project be something that the individual, and the team, wants to do – and not just something that someone else wants them to do. Once a person knows from having successfully completed a number of projects how to organize, how to configure teams, where they best fit in and so on, they can view almost anything as a project. Jobs – which many people don't enjoy – consist of repeatedly doing things that somebody else tells you to do. Projects, at least successful ones, are almost always chosen, opted-into by the members of the team. Our

hobbies, interestingly, have been the vehicle for integrating self-selected projects into many of our lives.

The big issue for the world is not to create more or new jobs, but to figure out effective ways for people to be compensated for whatever series of useful projects they want, and choose, to do. The challenge for employers is to rethink their current and future "jobs" as a serious of continuous, but discreet, projects, with specific roles, and then to match those roles with individuals. Many professional firms – lawyers, consultants, and others – have long done this, keeping people continuously employed who move from project to project successfully. Manufacturing companies have often floundered in having permanent employees who are not flexible enough to join new projects. Technology companies are often a combination of discrete project members, and more permanent staff members. Filmmaking draws into project teams individuals with a wide variety of different skills.

Because resolving any issue, big, small, local or global – as well as getting anything in the world accomplished – can be seen as a project that needs to be completed successfully, perhaps, in the future, all people will be on project teams and all work will get done in this way, which will hopefully be far more motivating to many. The key motivators – whether for kids in school or workers in a company – is that each project be real, that its successful completion have a measurable positive impact on the world, and that the issue the project is addressing be meaningful to the people doing it.

Much of the world already knows how to do real-world-impact projects, and we are continuously learning more about this. Sadly, the ones furthest behind on projects are the academics -- the closest they have gotten is "project-based learning (PBL)," where the projects are not real, but just another pedagogy for teaching content. Yet thousands of real-world impacting projects have already been done by workers and students around the world (see btwdatabase.org.) We can see students, of all ages, truly bettering their world, over and over again.

The best way to make real-world-impact projects into people's work is to make it into their education. This is why real-world impact accomplishment education is now making a bottom-up appearance around the world, in pockets all over the globe. To help advance this process I have recently created a new, non-competitive support network: ARISE-NET.WORLD whose goal is to unite these groups in a way that gets past individual brands (and egos) so they can work together – while each remaining individual and unique – to establish what they all do as an "alternative, equally valid, educational path" for those students and parents who choose to opt-in to an Accomplishment Track. ARISE-NET.WORLD supports and promotes all the individuals, groups, schools, parents, kids, teachers and places in the world who are doing Real-World-Impact Project Student Empowerment education. It is not creating this emerging new education alternative – it is *curating* it.

Two things the world will never run out of are problems to tackle, and unique people who can potentially tackle them. People, In the future, will increasingly mean newly empowered symbiotic human hybrids who can, as individuals and teams, apply the strength of their unique blends of human and technology components to creating new and positive value and solutions to local and global problems.

If every one of the eight billion in the world – at every level – begins to see him or herself, each his or her own way as a "solutionary" (the beautiful word of Zoe Weil), capable of providing a unique set of solutions to the unique set of problems each uniquely cares about and is willing to take on as projects, I believe we can get there.

That's the education everyone in the world needs.

Now to make it happen.

Marc Prensky is an internationally acclaimed speaker, author, and "practical visionary" in the field of education. Coiner of the term "Digital Native," he today promotes civilization-level change in global education, championing an emerging new "Empowered to Better Their World" education paradigm that more directly benefits all students and the world they live in. Marc has spoken in over 40 countries, authored seven books, and published over 100 essays; his writing has been translated into a dozen languages. Marc is the founder of The Global Future Education Foundation, devoted to promoting Real-World-Impact Accomplishment Education, and of ARISE-NET.WORLD (The Alternative Real-World-Impact Student Empowerment Network) uniting and supporting all those in the world offering an "Empowered to Accomplish" education to kids.

Previously in his career Marc headed an early prototype charter school. Worked for six years at the Boston Consulting Group, and founded and ran a learning games company for over a decade. Marc holds an MBA degree from Harvard (with distinction) and a Masters in Teaching degree from Yale. He has taught at all levels, from elementary to college. Marc's many writings, interviews and videos can be found at www.marcprensky.com. Contact Marc at marcprensky@gmail.com .

Post Script:

The metric I use for Real-world Impact projects – by teams of any age or level – is **Measurable Positive Impact** on the team's world. For young kids that world can be the family and community, for older people it can expand to the organization, the country and the world. "Measurable" can be quantitative or qualitative. "Positive" is probably culture-dependent and includes ethical issues. "Impact" is the team members' being able to say: "See that – it wasn't good earlier, but now it's much better. I and my team did that."

The idea is to help kids – and adults – realize that when they see a problem or something that needs fixing in their world, they have the power, agency and efficacy to

do something about it. We want people who know they CAN improve their world, and who know HOW to improve their world, because that has been their education.

Obviously, there are many other things in life besides projects, many of them specific to individuals and places. But a surprising number of things can be conceived that way. My growing thinking is that doing projects is something that is more or less universal, once we start to conceive more and more tasks as such. The more people acquire skills to do projects, and the more practice they have of doing them, the better projects will be done, and the better off the people—both the doers and the beneficiaries—will be.

I think one of the great opportunities currently being missed by EdTech is to develop a useful number of frameworks and tools, at different levels, to help teams with the various aspects of doing projects. We are beginning to see the emergence of design thinking frameworks, complexity thinking frameworks, value-creating frameworks, hackathons and other tools which are moving in this direction. I think this is very positive.

The true benefit I see emerging is that equipping all people in the world with project skills via experience and technologies can be thought of—at a time when the 3Rs of the past are quickly becoming machine skills—as the new universal basic education: a combination of all the thinking, action, relationship and accomplishment skills to get needed things done by all and for all.

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