

Future of Schools: Baseline Forecast

Introduction

This report examines the future of schools and education in primary and secondary schools in the next fifteen years to twenty years, nominally 2030. The report has been created based on both primary and secondary research to investigate the future role and function of schools.

The primary research included a questionnaire administered online, as well as four interviews of individuals with expertise in the field of education and schooling, both conducted in November, 2013.

Exploring the literature for secondary research uncovered a great deal of material, opinions and ideas about the future of education, schools, teachers and learning; however, less of the literature focused on the idea of the role, function or purpose of schools. Instead, the majority of the research concentrates on balancing policy and funding, teaching methodology and pedagogy, integration of technology into the classroom, and the like. However, using this type of information to create a forecast of how schools are likely to change helps to indirectly answer the question of what roles schools will play in society. There will be some inferences in regards to identifying the function of schools from these trends, but they will be discussed.

Present Functions

Schools today are primarily still based on the initial compulsory public schools, mass-era teaching model of industrial times. Sir Ken Robinson (2010b) and RSA Animate do an excellent job of illustrating this, questioning if this model continues to serve us, and using the TED platform to bring this discussion to the public. Schools have slowly evolved to be more than just centers for learning reading, writing and arithmetic. Debenhem & Parsons (1978) track the history of schools as they grew to take on tasks formerly reserved for the family, community and church, such as personal counseling, nutrition, health, fitness, social education, and sex education. Debenhem & Parsons believe schools took on these roles in part because the family environment was changing in part due to mass urbanization and busy parents, loss of community and extended family support, as well as rising social expectations and demands for equality. Furthermore, the pair maintain, that governments wanted to use schools to address the rising social expectations of the public, especially around issues of inequality, while also generating a greater degree of social stability and control.

The few articles that discuss and describe the functions of schools identify some common roles. Beyond the original functions of helping young children acquire the basic skills of reading, writing and arithmetic, one of the main functions of school

today is still the transmission of information and knowledge (Young & Muller, 2010). Miller (2013) adds five more functions for schools in industrial society, such as custodial care, teaching behavioural rules of conduct, cognitive development, socialization, as well as screening and sorting. A research group from the University of Amsterdam (van de Werforst, Dronkers, Karsten, van der Velden, & Webbink, 2011) identified four functions: improving equality of opportunity, enhancing efficient sorting of talents and interests, preparing individuals for allocation in the labour market, and socializing individuals into active civic engagement. The first two functions identified by the University of Amsterdam group mirror Miller's screening and sorting function, while the last two parallel Miller's behavioural conduct and socialization respectively.

So how will the function of schools change in the future? From the questionnaire conducted for this investigation (see Figure 1), respondents believed that the primary role of schools would be moving away from the development of social skills and knowledge acquisition. Their results indicated that they believed schools would be moving more towards to the development of values and morals, of life skills, and of entrepreneurship, with the additional focus of helping students learn to learn.

Figure 1: Primary Role of Schools - Change in Ratings

	In the Present	In the Future	Total Respondents
To help students develop entrepreneurship	28.57% 4	71.43% 10	14
To help students develop life skills	48% 12	76% 19	31
To help students develop social skills	90.91% 20	50% 11	31
To help students develop values and morals	41.18% 7	82.35% 14	21
To help students develop vocational skills	71.43% 15	61.90% 13	28
To help students gain knowledge	89.66% 26	48.28% 14	40
To help students learn to learn	62.07% 18	75.86% 22	40

To gain more insight into that question, the future of schools in terms of content and delivery need to be explored. Sir Ken Robinson (2010a) states, "Every education system in the world is being reformed at the moment." While this forecast is not focusing on every education system in the world, it is looking at schools in the developed nations as a whole. The OECD documents trends and the conditions of education in *Education Today 2013* (OECD, 2013a) and *Trends Shaping Education 2013* (OECD, 2013b). While there are many trends that can have an effect on the role of the school system, three emerge as the most salient and the most expected: the increasing focus on 21st century skills, relevant inquiry-based learning, and informal and distributed learning.

Additionally, while everyone knows that the influence of technology in education is immense today, its function is more to provide the means to change the role of schools than to be an independent driver in this domain.

21st Century Skills

What is the change? One of the most significant concentrations of new education reforms is the focus on helping students develop skills for the 21st century (Coates, 2010; Fadel, 2011; Knowledgeworks Foundation & IFTF, 2008; Miller, Shapiro, & Hilding-Hamann, 2008; OECD, 2013a; OECD, 2013b; Trilling & Fadel, 2009; Vuorikari et al., 2012). There is no definitive agreement on the definition of what 21st century skills. In general they are described as problem solving, critical thinking, systems thinking, creativity, innovation, entrepreneurship, collaboration, communication, information and media literacy, flexibility, adaptability, leadership, autonomy, agency, and self-direction (Fadel, 2011; Partnership for 21st Century Skills, 2009; Trilling & Fadel, 2009). Included and emphasized more strongly in some circles (BC Curriculum, 2013; Fadel, 2011; Trilling & Fadel, 2009) is the focus of skill building around character development and social emotional learning. Developments in all of these areas contribute to integrity, resilience, empathy, global awareness, persistence, and self and social awareness. The reforms towards this type of education are still in their infancy. Most advocates of education are pushing this type of skill-based competencies both from within the education system and outside of it.

Why is the change likely? Beyond the looking at the new reforms and plans for reforms towards 21st century skills, for example the BC Curriculum (2013) proposal, there are external trends that contribute to the likelihood of this change. Many believe that we are moving into a learning/knowledge economy (Miller, Shapiro, & Hilding-Hamann, 2008; OECD, 2013b). Additionally, the increasing trends of a more networked society, with more collaborations and work-life balance, (Knowledgeworks Foundation & IFTF, 2008) are opening up the job market for even more entrepreneurial pursuits and startups. In this type of economy, 21st century skills will become crucial. As work becomes more distributed and customized (Coates, 2010), individuals with greater autonomy, entrepreneurship, adaptability, and innovation – all 21st century skills - are more likely to thrive. The OECD (2013a) believes that:

Countries need an increasingly educated and skilled workforce to succeed in today's knowledge economy. That means good basic education in childhood and adolescence that equips people not just for the jobs of today, but with the ability to learn new skills for the jobs of tomorrow right through their lifetime. (p. 11).

Many others support this notion (Coates, 2010; Knowledgeworks Foundation & IFTF, 2008; Miller, Shapiro, & Hilding-Hamann, 2008).

Additionally, growing urbanization and the rise of cities raise new challenges such as alienation, pollution, safety, congestion, and health concerns (OECD, 2013b). The push towards more transparency and open-sourced projects continues to increase and this is creating the opportunity for new civic literacy and collaboration (Knowledgeworks Foundation & IFTF, 2008). 21st century skills, with civic engagement a key component, will play a key role in addressing these issues and will help create active and engaged citizens in the megacities of the world.

Relevant Inquiry-Based Learning

What is the change? By 2030, another significant change to education and schools will be the shift to material that is relevant to the student. What is more, the pedagogy will be increasingly centered on inquiry-based learning. John Dewey was one of the strongest voices in education in recent history. He called for hands-on, experiential learning that was balanced between teacher imposed curriculum and student driven interest (1902). Furthermore, Dewey was a strong proponent of teacher as facilitator or guide, not just lecturer.

Many teachers are moving away from the “chalk and talk” model, as one of the respondents called it. This respondent is the principal at an American International School and is leading an initiative at her school to guide teachers into the role of facilitating inquiry-based projects for students. She believes that this trend will continue and will grow as teachers change their roles from instructors to facilitators in motivating and managing student-led explorations - “a type of bottom up learning,” she says “instead of compulsive top down content enforcement.” These ideas are also echoed by Coates (2010), Fadel (2011), and Vuorikari et al. (2012).

The idea of inquiry-based learning of interest to the learner and relevant to their context, support the change from a focus on knowledge transmission to that of skill building. Fadel (2012) argues that changing the depth of content, breadth of content, and a new focus on context, all under the slogan of “relevance required,” will address many of the problems of today’s schools around disengagement and lack of motivation. Relevant inquiry-based learning also helps address learning for different purposes, such as practice, learning as doing, meaning, learning as experience, identity, learning as becoming, and community, learning as belonging (Miller, Shapiro, & Hilding-Hamann, 2008).

Data from the questionnaire conducted as part of this investigation (see Figure 2) shows the respondent's views on what type of education tools will be popular in the future. Mitra's (2013) self-organized learning environments (SOLEs) emerged as the most popular answer. SOLEs are quite similar to the relevant inquiry-based project approach. The basic structure involves having children set themselves up in groups of four and asking them a curiosity driving "discovery" question, then allowing the children to investigate freely and self-organize before each group presents their findings at the end. SOLEs are child-driven and collaborative and encourage transformative thinking, curiosity and open-mindedness. Figure 3 below outlines an example of a SOLE Discovery process.

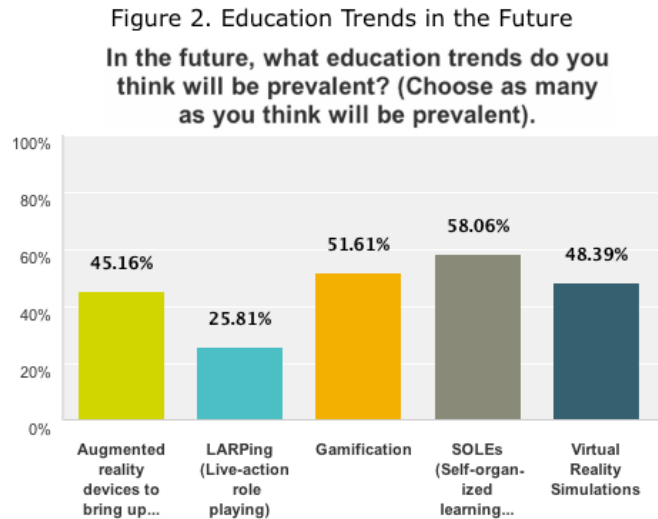
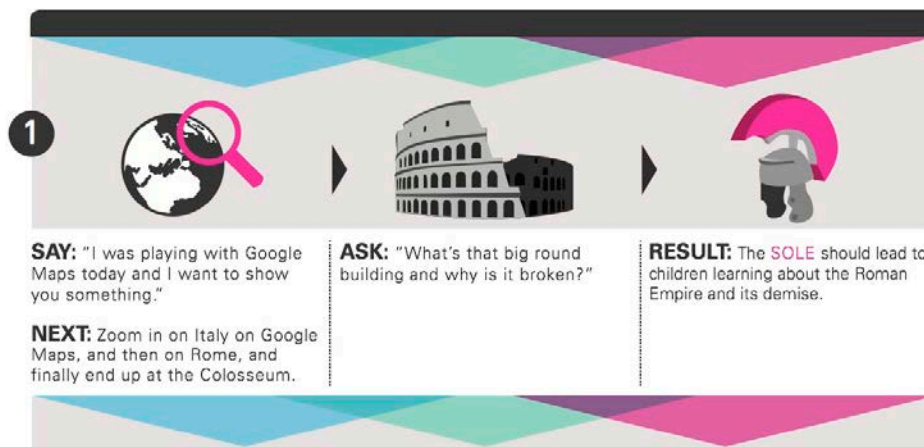


Figure 3. SOLE Discovery Example (Mitra, 2012)



Why the change likely? As the complexity of societies continues to increase with globalization, students are interested in addressing global challenges according to OECD's recent survey (2013a). With a student's intrinsic motivation already in place, schools can capitalize on their passion and form classes around students' interests (Mitra, 2013). One of the participants interviewed for this study works as a secondary school chemistry teacher. She explained how she has recently opened up a global education course because of her students' demand to know more about the world. Additionally a colleague of hers has established an urban agriculture class. Both have students registered on waitlists for next year already. This teacher foresees that schools are going to be focused more on the practical and towards application than they were in the past.

The maker movement and the development of simulation technology are two drivers that will support this “relevance required” approach to education. Already teachers are trying to use 3D printers to make learning more hands-on as well as augmented reality apps and basic simulation software (Educade, 2013). Other teachers and schools are trying to make learning more interactive and are experimenting with role playing techniques called LARPing, short for live action role playing. One school in Denmark has declared its primary teaching method as roleplaying and finds ways to fit the curriculum to this style (Educade, 2013; Vanek, 2013). There already is much talk the power of games to support learning with apps like Duolingo (van Ahn, 2011). With advances in the maker movement and in simulation technology developing rapidly (Zappa & TFE Research, 2013), schools will have much greater access and means to focus on relevant and inquiry-based projects.

A growing number of venture capitalists are also investing in education (Koetsier, 2012). This could affect the privatization of schools. There are also a growing number of students who are researching, developing, and inventing great insights and technologies. For example, student Jack Andraka helped develop a pancreatic cancer test that is 400 times more sensitive than the current standard (Wagner, 2013). It is possible that with the relevance and project-based focus and secondary schools could become something close to centres for research and development. Support and investment from business, corporations, governments, and the growing number of interested venture capitalists could lead to a new R&D function of schools.

Informal and Distributed Learning

What is the change? Students are increasingly learning independently online outside of regular school hours (OECD, 2013a). The prevalence of MOOCs, connected devices, and knowledgeable experts willing to share their insights is growing (Educade, 2013; Khan, 2011). Gorbis (2013a; 2013b) points out the ubiquitous practice of using one’s smartphone to find an answer to something that came up in conversation and calls this practice a socialstruct. She claims that this will continue as the primary way of learning in the future, a form of just-in-time learning, in the moment of need.

However, the OECD also reported that students were very interested in information about the environment, and schools were their most important source of knowledge in this subject (2013a). Learning about the environment is not so different from learning other school subjects such as science and social studies. Perhaps this stood out to students because of their concern about climate change and global issues combined with the fact that information on the subject often is complex and riddled with bias. Having a teacher to guide and facilitate learning in this subject would be seen as beneficial.

Together, these support the idea of the benefits of informal learning and general knowledge development outside of the classroom, but also the significance of having relevant learning on subjects that students care about going on inside schools. Some claim that classrooms will disappear as learning becomes more and more informal (Gorbis, 2013a; 2013b), but the education system has great inertia and there is rigidity to the status quo. Additionally there is great investment in refining and reforming education for the future. It is unlikely, though not impossible, that schools will be completely eliminated by this time in the future. A more likely outcome is that schools adapt to this new division of learning.

Why the change is likely? Developments in technology are the primary driver towards informal learning. Students' access to connected devices and information has never been higher. Already teachers are adapting to the ideas of informal learning. Three of the interview participants mentioned their use of the "flipped classroom" model. This type of teaching is utilizing the ease of access to the internet and the blended physical and virtual worlds students are growing up in. The flipped classroom involves students watching videos and lectures at home, while time in the classroom is reserved for discussion, questions, assignments, and projects. With the rise of MOOCs and learning videos like Khan Academy (Khan, 2011), the flipped classroom style is receiving more attention as more teachers create customize the approach for their own classes (Peshkin, 2013).

With developments in technology in the areas of Big Data, ambient computing, and ubiquitous online access, informal or distributed learning can be done and monitored anywhere (Vuorikari et al., 2012). Customized learning plans and tracks can be created and developed outside of the classroom. With this, jobs in the knowledge economy can take advantage and hire based on each individual's unique customized skill profile, rather than generic experience and achievement résumé (Miller, Shapiro, & Hilding-Hamann, 2008). One project in this direction is the Tin Can API, which is an open-sourced elearning manager that tracks and records learning experiences across a multitude of platforms online and offline (Tin Can API, 2012).

What does this mean for the Functions of Schools?

Schools will be significantly different in 2030, based on the changes outlined above. With the rise of informal, distributed learning outside of school, the classroom becomes a place for questioning, thinking critically, and discussing. Additionally, the high-relevance activity initiatives makes classrooms a place for working together on meaningful and practical projects with teachers acting as guides, mentors, facilitators, and inspirers, not lecturers. Schools will be focusing less on content and more on building insight and collaboration while concentrating on the development of 21st century skills. Developments in technology for accessing and monitoring

learning will assist in creating customized learning plans and profiles. Simulations and fabrications will create the opportunity to tackle pieces of real-world global issues.

With this new type of school in mind, how then will the function of schools differ from that of the recent past and the present day? First, it is evident that with ubiquitous access to information through connected devices and the rise in informal learning, the function of knowledge transmission is shifting outside of schools and into daily life given the emerging learning/knowledge economy (Miller, Shapiro, & Hilding-Hamann, 2008).

What is not likely to change by 2030 is custodial care. Having schools play the custodial role during the day allows parents to work and the economy to function. However, there is room for change even here. Miller, Shapiro and Hilding-Hamann (2008) have proposed the idea of using seniors in the community as general supervisors of children as they learn independently and informally. Having elders and grandparents assume guardianship while parents go to work is certainly not a new idea, but it may have new applications with the aging population and longer living seniors.

The function of teaching rules of conduct is also transformed in these new schools. Rather than enforcing and disciplining students to complete mandated lessons and work, schools of 2030 concentrate on fostering intrinsic motivation, so such behavioural monitoring is significantly less of an issue. Instructing students on rules of conduct will not disappear entirely, but will evolve into the character building components of the 21st century skills focus.

Similarly, the function of socialization will transform. Rather than enculturating students and attempting to address issues of social stability and equality from the top down, schools will socialize from the bottom up as they encourage curiosity in their inquiry-based approach to facilitate the development of identity of the individual. Furthermore, the focus on social-emotional learning that accompanies 21st century skills will create a generation of more personally, socially, culturally, and globally aware individuals who will independently develop values based off of their complex and changing contexts.

The screening and sorting function of schools will no longer play a significant role as job allocation and hierarchical economies will succumb to the changes brought on by the networked knowledge economy. With a more networked and heterarchically structured society and the technological developments in information management and Big Data to customize, monitor, find and assess individuals, the need for ranking and sorting of interests and talents is minimal.

Finally, as with knowledge transmission, part of cognitive developments expands outside of the classroom, as distributed learning is commonplace. New kinds of cognitive development evolve as teachers facilitate students by providing them

situations, not for learning what to think, but for learning how to think and to learn to learn. The 21st century skills of problem solving, critical thinking, systems thinking, creativity and flexibility are crucial in the new focus of cognitive development from basic knowledge skills to advanced cognitively-skilled tasks.

Conclusion

The changes within the education system and externally, in society, are all leading to significantly different delivery and form of schools in the future. Accordingly, the role and function of schools in society will change with it. By 2030, schools will still maintain their custodial role, but will significantly decrease their function of screening and sorting as the networked economy emerges. With informal learning, the role of knowledge transmission will be apart of everyday life, not just schools. A significant new development in the functions of schools will be around the changes from enforcing top-down behavioural codes of conduct to inspiring bottom-up character building of the whole individual. This is paralleled to the evolving function of socialization from enculturation to internally driven exploration through inquiry-based pedagogies. The most significant change in the function of schools of 2030 will be their concentration on advanced skill building overall as opposed to just basic cognitive development. The promise of 21st century skills, relevant inquiry based projects, and informal learning will push the schools of 2030 into these new functions.

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