

The International Experience in Implementing The New High School Education Program: Global Agendas, Issues, and Challenges in Vietnam

Tran Duy Nam (Ph.D)

Lecturer at Institute of Educational Managers Ho Chi Minh City, Vietnam

Phan Minh Phung (Ph.D)

Vice Principal at Institute of Educational Managers Ho Chi Minh City, Vietnam

Abstract

Making a change in public high school is essential in Vietnam, but it also fraught with challenges. Any ambitious new initiative is bound to have supporters, detractors, and obstacles to a seamless rollout. Today's many Vietnam's public high school and district leaders face a host of "issues" - many of them controversial-that demand immediate and ongoing attention. Among the most significant are: Transitioning to higher standards, aligning new assessments to the new standards, implementing teacher evaluation systems and managing budgets and spending with unprecedented restrictions. Education and teachers are of crucial importance in preparing young people and societies for the future. Education is strongest in those societies which value and support their teachers and public education systems. Teachers must take on new roles and responsibilities: they must be lifelong learners and help others to learn to know, to do, to be and, especially, to learn to live together and finally teachers must be intimately involved from the outset in the design of educational reforms, as well as in their implementation. Today's learners are digital natives-yet they come to school and power down their devices. As public high school educators in Vietnam public high school, we need to embrace the power of technology to make learning relevant for all students and adults. Using technology effectively in everyday learning can help students to strengthen their learning experiences and build on their intuitive technology skills.

Keywords: International experience, public high school, teacher, autonomy, accountability, digital learning, global, Vietnam

I. INTRODUCTION

Education in Vietnam is overseen by the Ministry of Education and Training (MOET), and it is an extensive network of state-run schools for students from roughly four years old to college-age. The system consists of five categories: kindergarten, primary, secondary, upper-secondary (also referred to as high school), and university level, with nationally administered exit and entrance examinations between each. Though there is a growing number of private schools and partially privatized schools, these exist almost exclusively in Hanoi and Ho Chi Minh City (HCMC), and students at these schools still represent a distinct minority of applicants to colleges and universities abroad (ASEM Education and Research Hub for Lifelong Learning, 2013)

Making a change in high school is essential in Vietnam, but it also fraught with challenges. Any ambitious new initiative is bound to have supporters, detractors, and obstacles to a seamless rollout (Silva, 2008). The author sees this scenario playing out in our Vietnam high schools as they introduce new academic standards, assessments, and teacher evaluation programs. However, the need for continuous improvement and shifts in instructional practices is clear (Goodlad, 1984). If we cut through the distractions, most people agree on the urgency and the intent of these current initiatives: to prepare public high students to be successful in the rapidly evolving global economy (Bray, 2009). To achieve this vision, leader and educators in Vietnam public high school must find a way to create an academically rigorous and relevant educational experience for all of our public high school students in Vietnam. While our public high schools continue to provide a quality education to our students, the world in which students will live and work is changing and advancing at an even faster rate than improvements in our public high schools in Vietnam. In spite of our best efforts, many public high schools are not preparing students for success in the world they will inhabit after graduation notably in the context of Vietnam (ASEM Education and Research Hub for Lifelong Learning, 2013).

II. NEED TO TAKE ACTION

Today's many Vietnam's public high school and district leaders face a host of "issues"- many of them controversial-that demand immediate and ongoing attention. Among the most significant are:

- ❖ Transitioning to higher standards
- ❖ Aligning new assessments to the new standards
- ❖ Implementing teacher evaluation systems
- ❖ Managing budgets and spending with unprecedented restrictions

The challenge of implementing higher standards, new assessments, and teacher evaluation systems deprives school leaders of the time to do much else, such as preparing for disruptive and transformative emerging trends that will impact students and staff for decades to come (Goodlad, 1984). In the nation's most rapidly improving schools, we have found leaders who are dealing with today's challenging issues within the context of potentially disruptive, emerging trends (Bray, 2009). In the process, they have avoided making short-term decisions that will haunt them in the near future as the disruptive, emerging trends change the dynamics in and around our public high schools in Vietnam. Leaders in Vietnam public high school need to understand and manage the potential impact of these trends rather than wait until the trends gain momentum and then try to respond (ASEM Education and Research Hub for Lifelong Learning, 2013)

One of the bigger challenges faced by Vietnamese high school students attending universities and colleges in the United States and other Western countries is the vast difference in the style of education received (Silva, 2008). Though the international schools follow a more western model, students at public and private high schools, even the specialized ones, receive what should really be labeled as a passive education (Cohen & Hill, 2001). Emphasis is placed on knowledge acquisition via rote memorization, and students have an intense schedule of exams that take the place of the critical thinking that comes from experiential and active learning (Bray, 2009). Even students who specialize in the hard sciences spend very little time in a lab environment, and Vietnam public high school students across the board have very limited writing experience upon graduating. Test scores determine placement, so students spend many hours outside of school in private classes on school subjects (Cohen & Hill, 2001). Electives, school clubs, involvement in the arts, internships, and hobbies are all devalued in comparison with high scores in STEM fields (ASEM Education and Research Hub for Lifelong Learning, 2013)

In communications with Vietnam's public high school staff, parents, students, community members, and media, schools need to address a few critical realities:

1. College and career readiness: MOET's national studies of remediation required for college freshmen show that 19.9% of those entering four-year programs and 51.7% in two-year programs need remediation. The national average graduation rates in our four-year colleges after five years is 36.6%. In our two-year colleges, we graduate 29.1% after three years.
2. Technology: Advances in technology will continue to impact the workplace, home, and society. I cannot even imagine what not-yet-conceived technologies will exist by the time today's elementary students graduate from high school. Also consider how our growing demand for immediate 24/7 information, service, and feedback will be an expectation in all facets of life, including learning. Our schools are in danger of becoming museums-with us as the curators.
3. Globalization: Many former developing countries, such as Malaysia, Argentina, Brazil, Indonesia, and even Panama, are emerging as major players in the global economy. With each of these nations having higher education standards, Vietnam high school graduates will find it increasingly difficult to compete.

III. TEACHERS AND TEACHING

We live in a knowledge-based society, one in which the new information technologies are destined to change the ways in which we access and process information and communicate, and thus the ways in which we learn to know and to do (Bray, 2009). Many fundamental changes in the role of teachers are needed if they are to fulfill their mission in preparing young people for the future. To be sure, the community has high, even if often unrealistic expectations of its teachers and schools. We will be held accountable by the communities which support us and depend on us to help their children to learn to know, to do, to be, and to live together (Cohen & Hill, 2001).

Our commitment as educators to ensuring quality and high standards within our own profession is crucial to improving quality of education and ensuring that we play the new roles expected of us. Teachers have a crucial role to play in not only the execution of any educational reform designed to help societies prepare for the future, they must be intimately involved in the conception and design of reforms from the outset (Bray, &Lykins, 2012).

As a conclusion, education and teachers are of crucial importance in preparing young people and societies for the future (Hanushek, & Rivkin, 2012). Education is strongest in those societies which value and support their teachers and public education systems (Bray, &Lykins, 2012). Teachers must take on new roles and responsibilities: they must be lifelong learners and help others to learn to know, to do, to be and, especially, to learn to live together and finally teachers must be intimately involved from the outset in the design of educational reforms, as well as in their implementation (ASEM Education and Research Hub for Lifelong Learning, 2013)

However, the instructional practices in many classrooms in public high school in Vietnam are out of step with:

- How today's students who are "digital natives"-learn outside of school
- What students need to know and be able to do to succeed in the world in which they will live and work

While we know learning should be an active process, many students are not reaching their full potential in classrooms where the lecture is the dominant mode of instruction (Bray, &Lykins, 2012). Consider the following graphic which shows the percent of students who fail, based on an active learning environment versus a lecture-based experience (Hanushek&Rivkin, 2012). The research shows that more students are likely to fail when the instructional strategy is lecturing. On average, 33.8% of students are likely to fail in a classroom where lecturing is the dominant strategy in comparison to 21.8% of students where the learning is more active (Cohen & Hill, 2001).

To change the level of activity on behalf of the students during class, teacher-centered, lecture-based instruction must give way to student-centered, interactive, applied, and problem-based learning in our nation's schools (Hanushek&Rivkin, 2012). The changing nature of Vietnam public high school student population, combined with new learning standards that require higher-level thinking and much more application-based and engaged learning, requires fundamental shifts in how and what we teach. Teachers need to know more than content (Bray, 2009). They need:

- A working knowledge of new approaches to instruction
- Strategies and tools that enable them to shift their role from disseminators of knowledge to facilitators of the learning process
- The ability to make effective use of data diagnostics

To enable teachers to assume these new roles and acquire the needed skills, districts must provide focused and sustained professional development, tools, and strategies. In addition, leaders need to be involved in the development, refinement, and implementation of new ways of teaching and learning (Bray, &Lykins, 2012).

IV. CHANGE, CHOICE, AND AUTONOMY

Woodrow Wilson once said: "If you want to make enemies, try to change something." Managing change in organizations-especially those with deep-seated traditions that can nurture widespread resistance to change-requires skilled leadership (Hanushek&Rivkin, 2012). Education leaders, in particular, must deal with ever-increasing external pressures to improve student performance and as well as subtle or overt internal resistance to change. Successful education leaders serve their schools by building a culture that supports change (Goodlad, 1984). They cultivate a broad-based vision of what "student success" looks like: typically that all graduates will complete an academically rigorous and life-relevant instructional program.

But translating culture and vision into sustainable improvement involves more than just insight-it also requires strategy (Goodlad, 1984). For example, the external pressures driven most recently by new state standards and teacher evaluation systems have created a "victim mentality" in many schools/districts: Why change? Why now? Why me? This is no longer a hurdle in the nation's most rapidly improving schools. These schools evaluate and respond to the externally imposed "agenda" within the context of their agreed-upon vision (Bray, &Lykins, 2012). In effect, they have absorbed the externally driven agendas into their own vision-driven agendas, thereby controlling the external demands, rather than being controlled by them. Structuring work in the context of a transformational culture and an agreed-upon vision of rigor and relevance for all students also enables leaders to deal with the internal resistance to change (Goodlad, 1984).

For example, successful school improvement leaders choose their battles. They recognize that if they wait until everyone is ready to accept badly needed improvements, things will never change. Instead, change-leaders embrace those staff members and stakeholders-typically one-third of the group who believe in the new initiatives and are eager to participate (Hanushek&Rivkin, 2012). Change leaders empower these "early adopters" as co-leaders. (Remember: leadership is not a position, but a disposition. Teachers, as well as administrators, can provide valuable leadership and influence.)

School improvement leaders encourage, support, and listen carefully to this top one-third as the teacher-leaders trail-blaze forward with effective and innovative instructional strategies, structures, and tools. As the early adopters refine these successful practices, the middle one-third of the staff watch and evaluate (Goodlad, 1984). When the new practices, tools, and structures prove to be working, the "new converts" are encouraged and supported to join. They are typically willing to do so, although are more cautious than the top one-third. When this middle one-third comes on board, albeit guardedly, then both the administration and teacher leaders are prepared to jointly "take on" the bottom one-third-the naysaying gatekeepers of the used-to-be. The team has assembled a critical mass to drive the changes that are needed schoolwide (Hanushek&Rivkin, 2012).

Those public high schools in Vietnam dedicated to improvement and transformation indicates that this process of taking control of both external and internal challenges-building the culture, creating the vision, and bringing best practices to scale-typically takes about three years. It is an evolutionary change, not revolutionary (Bray, &Lykins, 2012).

V. STATE STANDARDS AND ACCOUNTABILITY

Vietnam is in a transition as government policy is moving toward increased liberalization. The population of the country is quite young, and so demands on the education system will continue to grow for some time. Further integration into the world economy as Vietnam pushes toward middle-income status means a growing number of middle class and wealthy Vietnamese willing and able to spend money on higher education (Hattie, 2008).

All of this will mean more demands for an "international" education, either here in Vietnam at internationally accredited schools, or abroad. Vietnamese academic institutions remain subject to a highly centralized system of control (Jensen, Hunter, Sonnemann, & Burns, 2012). The central government determines how many students public high school may enroll, and how much teachers are paid. Even decisions as core to the operations of a high school as promoting teachers are controlled by the center. This system denies public high school in Vietnam the incentive to compete or innovate. Remuneration is based on seniority, and official salaries are so low that school instructors must moonlight excessively to support themselves. In contrast to China, Vietnam does not yet offer incentives to foreign educated Vietnamese (Hattie, 2008).

Knowledge generation is a borderless enterprise, but Vietnamese academic institutions lack meaningful international connections. Indeed, young foreign educated scholars frequently cite the concern that they will be unable to stay current in their fields as a reason why they wish to avoid careers in the Vietnamese academy. Vietnamese public high school not accountable to outside stakeholders, including, critically, employers. Within the public system, funding is not tied to performance or quality in any meaningful way. Similarly, government research funding is awarded uncompetitively and is primarily a form of salary supplementation. They have a captive market, for which study abroad is an option for a tiny minority (Jensen, Hunter, Sonnemann, & Burns, 2012).

More recently, the government has announced an initiative to establish a series of new institutions with international partners and has expressed a willingness to commit funds borrowed from multilateral lenders like the World Bank. While this policy represents a welcome recognition of a need to build new institutions of higher learning, many questions remain.

The Vietnamese educational authorities retain a strongly "state-centric" view of higher education collaboration in which governments, not institutions, are the primary counterparts. This approach is particularly ill-suited for working with the highly decentralized American system in which individual public high schools are the primary actors and the role of government limited ((Jensen, Hunter, Sonnemann, & Burns, 2012; Hattie, 2008).

Secondly, the government has displayed a "central planning" mentality in designing these institutional development initiatives, including by predetermining the fields in which each new public high school will specialize (initial proposals suggest a pronounced focus on science and technology-related fields, perhaps to the exclusion of the humanities and many social sciences) (Jensen, Hunter, Sonnemann, & Burns, 2012).

Thirdly, although the initiative is predicated on the concept that international partners will provide administrators and faculty, the funding mechanism is uncertain; it is not clear whether funds borrowed from multilateral donors would be available for the international partners. Finally, it remains to be seen how much actual autonomy these new institutions will be accorded.

VI. DIGITAL LEARNING

Digital learning is a catalyst for college and career readiness. Today's learners are digital natives-yet they come to school and power down their devices (Cohen & Hill, 2001). As public high school educators, we need to embrace the power of technology to make learning relevant for all students and adults. Using technology effectively in everyday learning can help students to strengthen their learning experiences and build on their intuitive technology skills (Hanushek&Rivkin, 2012).

Using technology thoughtfully for instructional purposes will allow us to stretch learners' thinking in ways that will lead to success in today's increasingly global economy and rapidly evolving digital environment. Blended learning and micro-credentialing are key areas to consider. Christensen, Horn, and Staker describe a blended-learning taxonomy, the Station Rotation, Lab Rotation, and Flipped Classroom models as methods to blend the main features of both the traditional classroom and online learning (Silva, 2008).

In addition to implementing formal blended learning structures, we need to keep pace with students and adults who operate in an increasingly mobile world. Outside of schools, people access information and communicate using smartphones, laptops, and tablets on a regular basis (Hanushek&Rivkin, 2012). Although some schools still have a "no cell phone policy," most students still bring their mobile devices to school-especially in high school and use them to communicate, collaborate and solve problems, even if they are not part of a teacher's lesson plan (Silva, 2008).

With an increase in kids going mobile, social media provides the context for of digital learners to connect, collaborate and create content in ways that are especially meaningful for them (Hanushek&Rivkin, 2012).

They are increasingly using a widerange of social media tools to do just that including:

» Texting: 71% of high school students and 63% of middle school students communicate with others via text messages, an increase of 44% since 2008.

- » Twitter: 3 out of 10 students in grades 6-12 are using Twitter to follow others or to share 140 characters about their daily life on a regular basis.
- » Videos: Since 2007 the number of middle school students creating videos and posting them online has doubled from 15% to 30% today.
- » Games: Showing a generational shift, nearly twice as many students in grades 6-8 participate in massively multiplayer online games compared to students in high school.

The principles used to engage users with games are making their way into schools (Cohen & Hill, 2001). Micro credentialing and digital badging have received much interest over the past few years. Digital badges, or credentials that may be earned by meeting established performance criteria, are images or symbols representing the acquisition of specific knowledge, skills or competencies. Badging is one way to recognize proficiency and generate motivation-there is an increase in adults earning badges for professional growth, as well as online resources developed for students (Silva, 2008). The Horizon Report suggested that augmented reality and game-based learning would gain widespread use, while advocates of game-based learning in higher education cite the ability of digital games to teach and reinforce professional skills such as collaboration, problem-solving, and communication (Cohen & Hill, 2001).

In order for principles of gaming to be applied to education, the stronger collaboration will develop between gaming companies and high school education publishers, which will compete directly with our traditional instructional programs. Gaming companies have mastered the ability to engage people with highly individualized, user-controlled, growth-model-based games. These games provide immediate feedback, and most can be used anytime, anyplace (Hanushek & Rivkin, 2012).

As the principles of gaming and badging are driven into the online delivery programs, the author believes students will increasingly move toward them. They will be more engaging and less expensive than our traditional system. They do, however, lack what the author believes is important: the personal contact often needed by many of our students. Strong teacher-student relationships help teachers make instruction relevant to their students. Without relevance, learning cannot be truly rigorous. John Hattie's (2008) meta-analysis described in Visible Learning lists teacher-student relationships as among the most effective influences on student achievement-even more so than professional development, teaching strategies, or socioeconomic status. The schools that will flourish in this new environment are those that embrace digital learning and are willing to disrupt their traditional delivery systems by creating a new hybrid. They will embrace the best of both systems (Silva, 2008).

VII. GLOBAL AGENDAS, ISSUES, AND CHALLENGES

1. Heightened Demand for Career Readiness

There is a growing realization that preparing a young person for career success requires a higher and different set of academic skills and knowledge than those needed for success in higher education (Silva, 2008; Andrew & Daniel, 2009). Some of the findings that have led to that conclusion include:

- ❖ The workplace has changed in fundamental ways. Unfortunately, our education system is not preparing students for this changing work environment. Among the changes in the workplace are:
- ❖ In the U.S. alone, 3.8 million jobs that pay in excess of \$50,000 a year has been unfilled for several months, despite the fact that we have 13 million people on unemployment. Why? We are facing a skills gap.

There is an increasing missing middle in our labor market. The reason is that technology is now doing to the middle-level jobs what it did in the 1970s, 1980s, and 1990s to entry-level jobs: people are being replaced by technology that can do the job better and less expensively. The growing tier of upper-level jobs requires increasingly sophisticated skills and the ability to be a lifelong learner in a technological, information-based environment (Andrew & Daniel, 2009).

»» There is an accelerating mismatch between college student majors and jobs. Colleges are not responding to this discrepancy. While the workplace is fundamentally changing, higher education is not. A very large percentage of students are leaving college ill-prepared for the 21st-century workplace.

For example:

- ✓ 48% of employed recent four-year college graduates are in jobs that require less than a four-year degree.
- ✓ 37% of employed recent four-year college graduates are in jobs that require less than a high school diploma.
- ✓ The increase in college tuition and fees has been twice the rate of inflation for the past 17 years.
- ✓ Whether or not a degree is earned, the average student leaves college having accumulated \$35,200 in debt.

The reading requirements for entry-level jobs, due to the need understand technical materials, are often higher than those needed for higher education.

Preparing our teachers to deliver the rigorous and relevant academic experiences that will prepare students to be college and career ready will require focused and sustained professional development, as well as an education and teachers, are of crucial importance in preparing young people and societies for the future (Hanushek & Rivkin, 2012). Education is strongest in those societies which value and support their teachers and public education systems. Teachers must take on new roles and

responsibilities: they must be lifelong learners and help others to learn to know, to do, to be and, especially, to learn to live together and finally teachers must be intimately involved from the outset in the design of educational reforms, as well as in their implementation (Andrew & Daniel, 2009).

2. Increased Emphasis on Application-Based Learning

Research has made it clear that relevance makes rigor possible for most students. Also clear is the fact that relevance does not occur one discipline at a time. For content to be relevant, the nation's most rapidly improving schools have found that students need to apply it to their personal areas of interest. That is why the Rigor/Relevance Framework has become for many schools the organizing framework for implementing new state standards, including the Common Core State Standards.

Knowledge, i.e., information, facts, and data, no longer needs to be encapsulated, dispensed and acquired from an all-knowing authoritative source such as a textbook, an encyclopedia or, yes, a teacher (Frey & Osborne, 2013). "The facts" are everywhere and are widely available from a variety of sources at the click of a mouse or tap on a screen. Most importantly, our students already know how to get it. The traditional classroom is, for many of them, an anachronistic model that's different from the world in which they live. They have intuitively figured out how to retrieve the information they need, use it to solve everyday problems and communicate and collaborate about the same information with others. How they are asked to do things in school seems increasingly disconnected from their world (Andrew & Daniel, 2009).

The challenges of providing a rigorous and relevant instructional program include (1) teachers who have not been trained to teach in an application modality and (2) our traditional mass delivery system. What is relevant to one child is not relevant to another (Frey & Osborne, 2013).

3. Use of Data Analytics to Implement Growth Models

Vietnam public high schools are data rich but analysis poor. We have volumes of data but, unlike our counterparts in medicine, we have not learned how to monitor, track and introduce effective interventions based on the data we have. As we develop more sophisticated assessments and use technology in more robust ways, we will see an explosion in the use of data for both formative and summative purposes (Frey & Osborne, 2013).

More sophisticated use of data will enable us to accelerate the movement toward implementing growth and continuous improvement models. With an increasing amount of data on individual students, we will find our one-size-fits-all instructional delivery system ineffective (Silva, 2008). The need to individualize the organization and delivery of instruction will require focused and sustained professional development. It will also cause great discomfort for those educators who wish to maintain their 20th-century instructional practices. Thus, data analytics will bring both great opportunities and great challenges.

Our present Vietnam education system has been increasingly focused on tests that measure a student's degree of mastery of a set of knowledge and/or skills at a point in time. It has not typically focused on the ongoing growth in learning of a student has over a period of time. That is about to change. By leveraging data, we will be able to better support growth models as a way to know what a student knows and is able to do. Rapidly improving schools have changed their focus to a continuous improvement model for every student. Students are, in effect, evaluated by the amount of improvement.

4. Developing Personal Skills

If you have a son or daughter in his or her twenties, your child may start bringing a significant another home more frequently. When you realize that this person may one day be your future daughter- or son-in-law- and in some cases, the future parent of your grandchildren- you may begin to think more deeply about him or her. As you get to know this person, are you asking about his or her high school transcripts? Probably not.

You are probably wondering what kind of person they are and whether or not they will be a good spouse to your child, and a good parent to your future grandchildren. To collect information about this person, you may ask some pointed questions, pose scenarios for a response, etc. You may also Google the person's name, and check out his or her Facebook status to get a sense of their digital footprint.

People carry their digital footprints with them forever, and these footprints will continue to grow as time passes, whether people post information about themselves or other people post information about them. This digital information will shape who they are. Not only will this impact your opinion as to whether a prospective in-law will be a good fit with the family, but a growing number of college admissions offices and human resource departments review a person's digital footprint as part of the admissions or hiring process (Frey & Osborne, 2013).

The responsibility of teaching today's students how to manage their digital identity and footprint falls to teachers, not just parents. Social media is forever documenting their experiences, pictures, posts and "likes." As educators, we need to teach students the skills they need to make the right decisions online and get them to think deeply about the consequences associated with social media interactions and how they will impact their long-term goals. While social media has allowed for increased digital collaboration and interaction with the peers- an important skill needed in today's workplace- it can also reduce academic performance, if overused. Finding balance is key (Silva, 2008).

We know that there is more to life than the core subjects of math, science, English language arts and social studies. Personal and interpersonal skills, such as responsibility, self-management, integrity/honesty, collaboration, and leadership, are critical in today's workplace. Adding digital identity management to this toolbox of "soft skills" or "employability" skills is now necessary to prepare our students for college and careers (Silva, 2008).

VIII. CONCLUSION

The cultures, practices, and communities associated with successful schools are each unique, but schools that make positive, transformational change all share these five central tenets. Strong schools address today's challenges in the context of emerging trends, approach leadership in a way that involves taking control rather than being controlled, and build a strong culture and shared a vision of success before trying to implement new initiatives. These schools also approach educational change in a systemic way-focusing on impacting student learning, rather than changing components or practices in isolation of the larger context.

Finally, effective schools use data holistically, looking at student growth over time and analyzing this data in relation to instructional initiatives and systemic innovations. These five tenets found in the nation's most rapidly improving schools are all interrelated and can inform the work of schools just embarking on academic change.

Money is not the biggest obstacle to elevating education and science. The decay of our science and education is not due to a lack of money but to the fact that we do not know what to do or how to manage. Science and education is a complicated system that can be well managed only when its specific features are thoroughly understood and informed by the experience of the world and of preceding generations. Most important of all is a strategic vision for immediate and long-term objectives, direction, demand, capacity relevant to development trends, guiding ideology, and a general path of actions; this constitutes a philosophy of science and education in the present world.

Without systematic thinking and a comprehensive, strategic vision, one could easily make himself busy with trivia and a here today there tomorrow approach, endlessly "reforming" in a fragmentary and inconsistent way, exacting huge costs but resulting in nothing more than complicating a system that is already crippled and devoid of vitality. Given the fact that the present world is changing rapidly, the development of science and education requires leaders who are not only well-intentioned and honest but who also have the ability to quickly perceive changes and think creatively to find the most adaptive development strategy.

REFERENCES

- Andrew, J. R., & Daniel, W. (2009). 21st Century Skills: The Challenges Ahead. *Teaching for the 21st Century*, 67(1), 16-21.
- ASEM Education and Research Hub for Lifelong Learning. 2013. Lifelong Learning and Employability. <http://www.dpu.dk/asem/researchnetworks/corecompetences/> (Accessed 16 September 2017).
- Bray, M. (2009). Confronting the shadow education system: What government policies for what private tutoring? Paris, IIEP.
- Bray, M. & Lykins, C. (2012). Shadow education: Private supplementary tutoring and its implications for policy makers in Asia. Manila, ADB.
- Cohen, D. & Hill, H. (2001). *Learning and policy: When state education reform works*. New Haven, Yale University Press.
- Goodlad, J. I. (1984). *A place called school*. New York: McGraw-Hill.
- Hanushek, E.A., & Rivkin, S.G. (2012). The distribution of teacher quality and implications for education.
- Hattie, John (2008). Visible learning: a synthesis of over 800 meta-analyses relating to achievement.
- Frey, C. B. & Osborne, M.A. (2013). The future of employment: how susceptible are jobs to computerization?
- Jensen, B., Hunter, A., Sonnemann, J., & Burns, T. (2012). *Catching up: learning from the best school systems in East Asia*, Grattan Institute.
- Silva, E. (2008). *Measuring skills for the 21st century*. Washington, DC: Education Sector.