Ministry Of Education
The Pedagogic Administration
R&D, Innovation
And Development Division

FUTURE-ORIENTED PEDAGOGY 2

Trends, Principles, Implications and Applications

A summary and applications map
2018 Edition

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A summary and applications map | 2018 Edition

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Table Of Contents

SYSTEM-WIDE COMPASS IN A CHANGING REALITY

" To everything there is a season and a time to every purpose under heaven. "

(Ecclesiastes, 3:1)

The future is not an unseen reference point on our horizon, but rather, the road that we are paving today and the path along which we are presently walking. In this day and age, success in the present requires values that promote future-oriented thinking and shaping the future we want. Global future trends, along with the challenges and opportunities they offer, are the key to the existence of a relevant organization that can adapt and thrive in a changing and shifting reality.

Future-oriented pedagogy will help shape a graduate of our education system who can successfully cope with challenges of the 21st century's changing reality, based on knowledge, skills and values. An Israeli graduate will master a wide range of interdisciplinary knowledge, will be able to find and collect relevant knowledge, to interpret and analyze it, and apply it so as to advance his own activity. He or she will have cognitive, personal and social skills that makes it possible to use the knowledge collected to their own benefit and that of society in general, and the graduate will possess both local and international norms and values in the spirit of Israel's Declaration of Independence and global values that support multi-culturalism. In this way, our graduates will become leaders.

Future-oriented pedagogy, which was developed by the Future-Oriented Pedagogy Planning Unit in the Research and Development Division of the Pedagogic Administration, uses a system-wide compass in order to enhance the relevance of education.

In this spirit, a pedagogic model was developed based on future trends with a time range of ten years forward in various spheres of life - society, technology, economics, the environment, politics and education - in Israel and around the world. These trends challenge the education system to develop skills for innovation, creativity and critical thinking, and to develop global and multi-cultural capabilities. During our research we found that there are major principles that repeat themselves within these trends in Israel and globally: Personalization, collaboration, informalization, glocalization, adaptivity and self-integration. These principles are the pedagogic and organizational springboards for change that will move the education system forward given the changing and shifting reality in which we live.

The time is now for collaborative thinking and proactive measures. Together we can collaborate by utilizing the wisdom of the past and looking at current trends, to shape the future we want.

Congratulations to all those who are engaged in this work.

In appreciation,
Shmuel Abuav
Director-general
Ministry of Education

INTRODUCTION

Successful organizations in Israel and around the world are characterized by leadership and values that promote future-oriented thinking and shaping a desired future. Systematic reference to global and local future trends – social, technological, economic, environmental, political and educational – which present us with challenges and opportunities, is the key to the existence of a relevant organization that can adapt and succeed in a changing and shifting reality.

The Ministry of Education established the Future-Oriented Pedagogy Planning Unit in the Research and Development Division of the Pedagogic Administration, which constitutes a system-wide compass to enhance the relevance of education for the learner and the world in a changing reality and in light of future trends.

The first edition of the R&D policy outline for future-oriented pedagogy was published in December 2016. This is a summary of the second edition, where you will find an updated model of future-oriented pedagogy that focuses on the six core principles: Personalization, collaboration, informalization, glocalization, adaptivity and self-integration.

This document calls for pedagogic and organizational development of education systems on the basis of the model's six principles. At the end of the paper you will find a map of applications that offers examples for applications and practical initiatives in Israel and around the world, as well as digital support tools.

We are often asked why the pedagogy we designed is called future "oriented." "Oriented," because we find ourselves in the present but orienting ourselves toward the future, because we are moving forward, with a wide-ranging and future-oriented view, toward other worlds like the wings of a bird.

The Challenge of Relevance

John Dewey argued that the purpose of education was to teach a child to think, and not to teach him what to think. The information age proves that the most meaningful way to ensure a person's well-being is through education, knowledge and learning. These can bridge the socioeconomic gaps and difference between social and economic classes and allow every citizen of the world to have a proper and dignified existence. Rapid demographic changes amplify the need for education knowledge and learning, from early childhood, to school and academic studies, to lifelong learning. Education has played a significant role in all aspects of society throughout human history: From the impact of urbanization processes on schools, families and communities; to controlling the obesity epidemic that is taking over the world, or coping with the way new technologies are fundamentally changing the way our children think. The main challenge of today's education system is to maintain and enhance the relevance of education for the learner, and the learner's relevance for the world. For this reason we must continuously be shaping education.

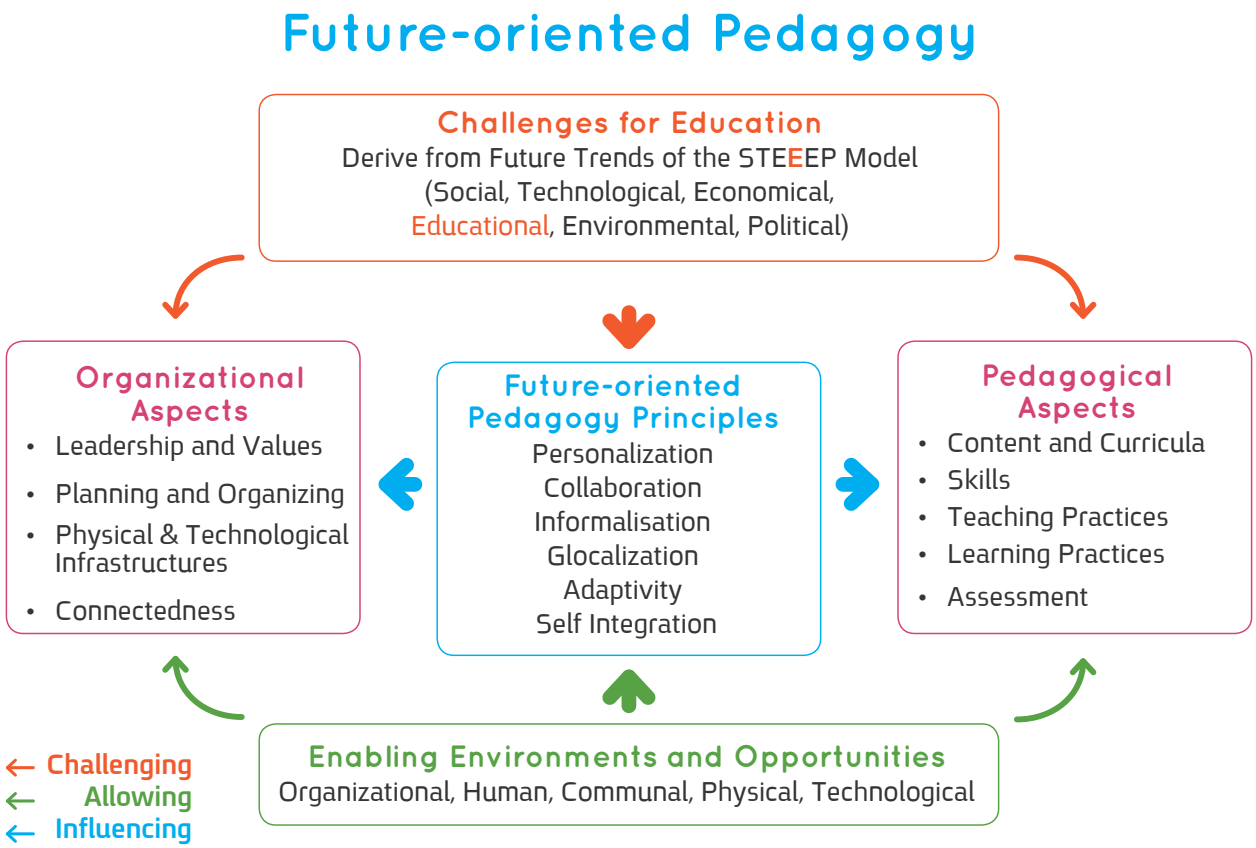
The perception of future-oriented pedagogy (FOP) aspires to aid the education system in coping with the challenge of relevance. It is based on the sphere of exploring the future and combines aspects of the utopian and futuristic approach. Future-oriented pedagogy assumes that the world of education is deeply influenced by the external reality in which it operates; as such, this approach emphasizes shaping a desired future pedagogy based on informed choice, which will address the challenges and opportunities derived from both general and educational trends for the future. This approach takes the educational principles that must already be implemented in the present, and offers general operating principles for the future. The goal of the model is to direct pedagogic development carried out by all entities in the education system and R&D units at the head office level and on the ground. The model was designed by the Future-Oriented Pedagogy Unit on the basis of research and development work executed in 2016 and 2017 to identify futures trends that can impact education, define educational challenges and formulate recommendations.

The Future-Oriented Pedagogy Model

The Future-Oriented Pedagogy model is a system-wide compass that enables the present education system to adapt itself to the changing reality of the future, and preserves the relevance of education for the learner and the learner's relevance for the world.

This model was developed in response to challenges derived from surveying future trends around the world in the social, economic, technological, environmental, political and educational spheres.

At the heart of the model are six basic general principles that are influenced by future trends and are applied holistically to pedagogic and organizational aspects, while taking advantage of the technological and environmental opportunities this affords.


Future-oriented Pedagogy
Challenges for Education
Derive from Future Trends of the STEEEP Model
(Social, Technological, Economical,
Educational, Environmental, Political)
Organizational Aspects
• Leadership and Values
• Planning and Organizing
• Physical & Technological Infrastructures
• Connectedness
Future-oriented Pedagogy Principles
Personalization
Collaboration
Informalisation
Glocalization
Adaptivity
Self Integration
Pedagogical Aspects
• Content and Curricula
• Skills
• Teaching Practices
• Learning Practices
• Assessment
Enabling Environments and Opportunities
Organizational, Human, Communal, Physical, Technological
← Challenging
← Allowing
← Influencing

Future Trends

Future trends are global,[1] crossing political boundaries and presenting challenges that require numerous actors, countries or organizations. The trends have a close reciprocal relationship between themselves, and between them and the world of education with a cause and effect relationship.

Global trends, for example, along with rapid technological changes and reduced transportation costs, make it easier for individuals to move between countries and continents and contribute to far-reaching changes in areas such as ethics, linguistics and culture throughout the world in general, and particularly in Europe.

In this edition we will present, beyond global trends, those trends that are unique to Israel and which, at times, stand in contrast with the global trends. Several more prominent trends were chosen, based on surveys and studies conducted during the past four years (since 2014), which are likely to remain over time and to greatly impact the educational sphere.

1 Encyclopedia of Ideas - New Economy. http://haraayonot.com/idea/new-economy. (in Hebrew).

Social Trends

Life expectancy is on the rise, there is increased urbanization, migration and immigration; glocalization along with changes in the family structure, more women in the workforce, improvements in health, welfare and lifestyle in affluent societies. Alongside the availability of luxuries and better quality of life, there are negative trends such as new sources of stress on society at large, particularly for children.

Social trends in Israel

In Israel trends relating to glocalization, urbanization and family are quite prominent. The challenges and opportunities for the education system relate to spheres such as: the need for the system to cope with issues broadly; community and home dealing with multi-culturalism and socioeconomic variance; promoting and developing civil literacy and creating a safe environment for pupils, improving quality of life for learners, including equal education opportunities from a young age; the role of the nation-state and its responsibility toward residents, and options for promoting local equality.

Technological Trends

Technology is embedded in every future digital sphere and people experience a digitally-enabled world whose boundaries with the real world are blurred. Technological advantages are not limited to the Internet: Biotechnology innovation - genetic sequencing, for example - has the potential to completely revolutionize our lives, and significant technological breakthroughs are presently being made using disruptive technologies.

Technological trends in Israel

In Israel there is a clear link between the need for security and survival and the development of technological innovation. Advanced technological know-how in core technologies, some of which was developed for military purposes, has created in Israel an entire industry that drives the world of global commerce. The resulting challenges and opportunities for the education system relate to spheres such as development of information management skills and broad computer literacy, "teaching the teacher," focusing on biotechnology, and dealing with cyber risks that necessitate greater Internet safety.

Economic Trends

The new economics is based on the assumption that there is an unlimited resource known as "human knowledge" (Ginsburg, 2000).[2] It takes place and is realized through digital technologies and communications networks.[3] It is global, deals in abstract entities, ideas, information and relationships; it is dynamic and boasts "connectedness" and flexibility. The new economy places the customer at the center, promotes transparency, accessibility and openness while removing bureaucratic obstacles and barriers to knowledge.

2 Encyclopedia of Ideas - New Economy. http://haraayonot.com/idea/new-economy (in Hebrew).
3 https://en.wikipedia.org/wiki/New_economy

Economic trends in Israel

Data show that in Israel (2017)[4] there is a permanent trend of strong growth, rising wages and investment, growth in exports of goods and services and in the high-tech industry. There has also been a concomitant decline in unemployment and poverty rates. In 2016 the GDP and the GDP per capita grew around four times that of 2015.

The resulting challenges and opportunities for Israel's education system relate to spheres such as: Maintaining innovation in a competitive reality; financial education and skills needed to be self-employed; emotional resilience to deal with an environment of uncertainty; reducing gaps and promoting equal opportunity; global partnerships with developing nations; fostering the capabilities, professions and skills that are relevant for the new employment environment, and developing and integrating different populations into the workforce.

Environmental Trends

The human impact on the natural world has increased dramatically in terms of the scope of human activity and its strength. Many negative trends, such as the loss of tropical forests and rising greenhouse gases in the atmosphere, threaten the ecological balance. The worldwide trend is towards a broad approach for sustainability that can balance economic grown with preventing disastrous consequences for the natural environment. We can solve these problems only through global cooperation that includes regulation to cause meaningful change for the long term. This requires a uniform policy, starting at the global level to the national-governmental level, and ending with local-community initiatives.

Environmental trends in Israel

Israel is in a constant struggle with resources that are in short supply: land, water and natural minerals (although in 2021 it expects to see the first effect of its natural gas explorations); air pollution and the need to increase renewable energy sources and recycling. The resulting challenges and opportunities for the education system relate to spheres such as advancing an educational approach that includes sustainability; forming local and global environmental awareness; identifying teaching opportunities derived from environmental trends; and creating a learning platform based on ecological understanding.

Political Trends

Global institutions, laws and global indices create a mindset of the global citizenship alongside state citizenship.[5] Concomitantly there is an opposing internal pressure from national, ethnic and cultural communities. This phenomenon is known as "glocalization," and it reflects the constant conflict and tension between global identity and local-national identity. These processes require a new approach towards privacy and glocal balance.

4 Data from the Global Wealth Report published in November 2017 by the Credit Suisse Research Institute. http://www.nrg.co.il/online/1/ART2/902/478.html

5 Outline for a policy on "future oriented pedagogy" - http://meyda.education.gov.il/files/nisuyim/pedagogyamotatadittakzir.pdf

Political trends in Israel

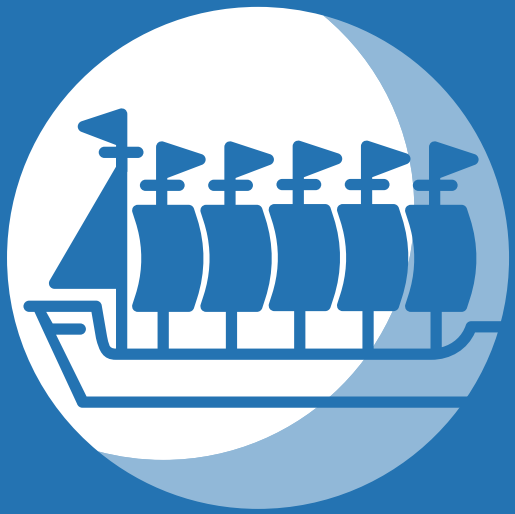
In Israel we are coping with local constraints that include, for example, the need to invest in defense; integrating Israeli Arabs in the fabric of Israeli life; the effect and consequences of wars on the public's perceptions; forging the image of Israel as a Jewish democratic state. The challenges and opportunities for the education system relate to areas such as the schisms within Israeli society, openly engaging in political issues and enlisting cooperation, support and resources vis-à-vis the defense establishment.

Educational Trends

Future trends in the social, technology, economic, environmental and political spheres have an impact on the world of education and drive educational trends that change its characteristics so as to provide appropriate educational solutions for a changing reality. Understanding global future trends in the spheres of education, which stem from the general trends, will help us formulate focused and effective directions for action to promote education in Israel and adapt it to the needs of the 21st century.

The most prominent educational trends:

- Data-based assessment, making results accessible in real time
- Learning assessment is performed anywhere, at any time, under any conditions
- Personal evaluation, peer and professional evaluation
- Educational institutions as future-thinking organizations that nurture innovation and autonomy
- Expanding the school's responsibility for the pupil's well-being, safety and happiness
- The paradigm of the ecology of learning flows
- Involving new players and models in education
- Removing the boundaries between the school and the outside world
- Schools as organizations that are quick, flexible and autonomous
- The flat classroom
- Global virtual learning initiatives on global learning networks
- Flexible learning spaces that are informal and support creativity and mobile learning that are connected and located outside the classroom in the local and community space
- Individual and portable computer infrastructures in digital learning environments and virtual activity spaces



Principles of Action

The six principles of action of the future-oriented pedagogy model represent the spheres on which the education system must focus in order to keep education relevant in a changing reality. The remainder of this document devotes a chapter to each principle and its implications regarding aspects of the pedagogic and organizational components. The document brings examples of technological tools and educational initiatives that can support the realization of each principle.

Principle of Personalization

Personalization refers to the personal adaptation of content, goods and services to an individual's unique needs and desires in order to increase the added value he or she receives. Personal adaptation can be carried out by the person himself, or by the entity supplying the good or service, either overtly or covertly, using smart algorithms or through service in real time. Personalization is the global trend that represents the transition from serial production and marketing to the masses, to production and marketing with personal adaptation in light of accelerated technological development.

Personalization in education

The world of education will also undergo a gradual transition from serial education for the masses to personally adapted education. In education this means personal adaptation of goods, processes and services for any person (pupil, teacher, principal, etc.), according to his abilities, needs, desires and situation.

Applying the personalization principle helps us cope with the challenges of the changing reality and education's relevance in the following ways: First, personal adaptation enhances the added value that the learner gets from the educational resources that are invested in him, because it is adapted to his or her needs and aspirations. Second, education that is personally adapted tends to be future-oriented, because it is oriented towards a younger generation who are actively experiencing future trends in their daily lives. Finally, personalized education makes it easier for the learner to deal with future challenges because he is doing so in a way that is the most appropriate for him. Personalization should be applied to education in a practical way, that is, at all levels of the system - starting from principals and teachers to pupils and parents. Focus on the learner will go from typical and standard to personalized, through the teacher, the learner himself and with the help of technology that automatically adapts learning to the learner.

Principle of Collaboration

Collaboration is the process of two or more people or organizations working together to complete a task or achieve a goal.[6] The added value of collaboration lies in its ability to empower the participants and allow them to achieve, together, the goals that they would not have been able achieve alone. Collaboration is a powerful tool for improving achievement and creativity because the collective effectiveness significantly intensifies the group's aspirations, motivation, morale and resilience against their challenges. Collaboration's advantages makes it a fundamental operating mechanism in all areas of our lives: through a shared social, political or spiritual vision; through technological platforms, which support collective intelligence and the wisdom of the crowd[7] that benefit from the ability of groups to contribute towards cognitive collective thinking to advance innovation, problem solving, making decisions and forecasts; and in the global economy of knowledge sphere that is based on super-connectedness.

Collaboration in education

Collaboration is a process in which two or more entities work together in way that intensifies their capability as individuals in order to achieve a shared pedagogic goal that could not have been achieved by each one working alone. The principle of collaboration leads to cooperation between individuals and institutions in the world of education and society. Applying the principle

6 Wikipedia, "Collaboration" - https://en.wikipedia.org/wiki/Collaboration
7 Wikipedia, "Wisdom of the crowd" - https://en.wikipedia.org/wiki/Wisdom_of_the_crowd

of collaboration in education helps us cope with the challenge of a changing reality and the relevance of education in the following ways: First, it enhances the ability of individuals and organizations to achieve effective learning and to improve education for learners; second, collaboration enables learners to understand the complex and changing reality better, since, on the one hand, each individual brings their own unique perspective; and, on the other hand, the biases of each one are offset and balanced out by the other members of the group. Finally, collaboration enables local or decentralized groups to learn and work together in order to shape a desired common future in the face of challenges and opportunities. Collaboration in the sphere of education is implemented through two complementary paradigms: The paradigm of cooperation skills as an educational outcome, which focuses on cognitive, personal and cultural cooperation skills of individuals or groups as the desired educational outcome of collaborative processes; and the paradigm of collaboration as a process for achieving outcomes,[8] which focuses on applying cooperative processes to achieve the desired outcomes for the collaborative action.

Principle of Informalization

The principle of informalization is related to the phenomenon of human activity performed outside of formal organizational and institutional frameworks, which traditionally were charged with content, management and evaluation. New technologies and patterns of behavior have created a wealth of new opportunities for informal human activities, with tremendous value for the individual and for society, and enable the individual to enhance his abilities and achievements and to maximize opportunities for action and learning in all areas of his life. Technological advancement allows individuals to easily and efficiently perform informal actions that have value and offer new opportunities for action and learning, anywhere and anytime. However, the essential challenge for those engaged in informal activity is to have society recognize the knowledge, experience, skills and accomplishments acquired in the framework of this type of activity.

Advanced and developing applications for informal activity exist in a wide variety of spheres. In the social sphere, social networks and self-organization enable informalization among groups and communities at all levels. Organization such as this is what drove mass protest movements, such as "the Arab Spring" (2010-2012), the social protests in Israel (2011) and the current women's protest ("MeToo"). In the economic and employment spheres, work has gradually changed from a formal place we go to, to something we do.[9] [10] Individuals work at several jobs and positions[11] and are defined by different statuses (self-employed, salaried worker, company) simultaneously. An individual's identity and professional activity are not defined on the basis of formal affiliation with the organization where he or she is employed. Moreover, studies show that some 80% of learning in the workplace happens informally.[12]

8 Collaboration - Partnership for 21st century skills.

9 Hines, A. (2011). "A dozen surprises about the future of work. Employment relations today (38)1, 1-15.

10 Cohen, Nirit. "What do you do exactly? The future world of work." Globes (July 19, 2017).

11 Wikipedia, Multiple careers

12 Informal Learning Blog, "Where did the 80% come from?" http://www.informl.com/where-did-the-80-come-from/

Informalization in education

Informal education is learning that takes place outside of formal educational and organizational frameworks and takes advantage of the potential learning opportunities we find more and more throughout our lives. Applying the principle of informalization in education enables us to cope with the challenges of the changing reality and relevance in education in the following ways: First, it enhances the learners' ability to learn using varied opportunities for learning beyond the formal opportunities. Second, informal learning is future-oriented and introduces learners to challenges even before the formal education system is equipped to deal with them. Moreover, the informal learning environment is future-oriented, more open and innovative, since it is based on multiple learning providers that are free of the numerous restrictions placed on the formal education system that prevent it from changing at a comparable pace. The principle of informalization in education is part of the paradigm relating to the ecology of learning flows where learning resources are prevalent and accessible, where plentiful learning opportunities are found in all areas of life so that learners can independently move in and out of the potential learning flows in their environment and learn anywhere, anytime, in any situation. This paradigm, which is supported by diverse technologies, open education sources and tools for creating online content, enables learners to be free of the traditional learning model based on formal educational institutions.

Principle of Glocalization

Glocalization[13] describes a dialectical process between two contradictory trends - globalization and localization. Globalization erodes the nation-state from "above" with national, technological, financial, communications and commercial super-systems. In response to this, opposing trends develop from "below" that also erode the nation-state; these are local in nature and reinforce ethnic, religious, racial, national, regional and cultural sub-nationalities. Globalization, on the one hand, promotes unprecedented unification of human societies and leads to the creation of a single human society. On the other hand, it also causes the equally unprecedented dissolution of human societies into more specific identity groups. As noted, the dissolution of boundaries and identities causes a local counter-reaction that attempts to fix boundaries and reinforce identities. Global trends are powerful and therefore it is understandable that in many cases, in the long run, they cause the local counter-reaction in societies that are not sufficiently unique and powerful. Glocal strategies are the ways in which nations, societies and cultures can deal with aspects of glocalization, enabling different nations, societies and cultures to simultaneously have hybrid national identities and deal with the cultural homogeneity that comes with globalization. These strategies include: integrative glocalization - which enables integration of the global and local dimensions in a way that enhances them both; balanced glocalization- which provides a constant balance between the global and local dimensions in a way that minimizes the

13 Wikipedia, "Glocalization" - https://en.wikipedia.org/wiki/Glocalization

tension between them; and exploitive glocalization - which focuses on exploiting one dimension so as to exclusively and uncompromisingly advance the other dimension.

Glocalization in education

Glocalization is the crystallization of global and local skills, identity and consciousness within the learner. Creating a harmonious balance between them that will enable him or her to act and succeed in both spheres simultaneously. Applying the principal of glocalization in education can help learners cope with the challenge of a changing reality and relevance of education in the following ways: First, it enhances the learner's ability to act and succeed in both the global and local sphere. Second, it motivates the learner and the education system to dynamically choose the best balance point for them along the range between global and local, which is best suited to the changing reality. Additionally, the effort to become local and multi-cultural encourages the learner to be exposed to wider geographical and cultural circles that he would not otherwise be exposed to. Finally, glocalization offers strategies to mitigate the contradictions and contrasts between the two dimensions, thereby helping the system and the learner deal with conflicting challenges.

The world of education is also influenced by global and local trends that are often in conflict. Globalization turns us all into pseudo-immigrants[14] in the global sphere, who must develop new abilities and sensitivities in order to succeed and flourish in this sphere. Global economic trends lead to a new economic perspective toward education, which is perceived as an economic resource aimed at improving global economic competitiveness. National education systems place increased emphasis on core studies that can drive their economy alongside reinforcing national content at the expense of humanistic and artistic content.

Principle of Adaptivity

The modern age is one of rapid, powerful and complex changes. Today it is hard to imagine how the future will look just a few decades from now. Formidable paradigm shifts change world orders and create a reality that is substantively different from the one we knew previously. The pace of these changes is accelerating, as the new reality produces mechanisms that generate change at a faster pace. Many changes are taking place in all areas of life: life expectancy, the nature of the modern family, the dominance of Gen-Y in society, increased equality, giving all populations a place in society, the developing leisure culture, nutritional and health habits, and more. Technology is the key factor that is changing the human environment, and human beings themselves. It is causing the disappearance and creation of professions; environmental changes such as global warming while helping us cope with them; it alters the political power balance and structure, such as government transparency for citizens, and changes the nature of social values and structures, such as the value of privacy.

14 Suárez-Orozco, Marcelo. "Education in the global millennium: A conversation with Marcelo Suárez-Orozco." *Hed Ha-Chinuch (2007), 10 (in Hebrew).*

These characteristics of the era of changes create an unprecedented challenge for individuals, organizations and nations, which must make decisions and operate in a complex reality that is changing rapidly but that they often cannot understand or adapt to. The difficulty in digesting these rapid changes creates the experience of future shock,[15] which futurist Alvin Toffler described as the undermining of stability, severe emotional stress, confusion and a feeling of having lost one's way.

The added value of the principle of adaptivity lies in the ability to shape and apply the desired future in the changing reality so as to preserve organizational or personal relevance. There are two fundamental approaches that the organization or individual can utilize in order to accomplish this. One is the future-oriented thinking approach, which is based on projecting possible organizational or personal futures and to shape the desired future in the present, given the projections, in order to prepare for them in advance. The second approach is that of "agility," which combines speed with flexibility and assumes that the future will always remain unknowable, therefore it is important to develop organizational or individual capabilities that will allow for rapid adaptation in real time to the changes happening in the present.

Adaptivity in education

Adaptivity in education means enhancing the ability of the learner and the system to shape and apply the desired future, to adapt, to act and succeed in the complex and changing reality. Applying the principle of adaptivity in education is helpful in coping with the challenges of a changing reality and relevance of education in the following ways: First, adaptivity enhances the ability of the learner and the system to act successfully in a reality that is complex, vague and fraught with uncertainty. Second, it enables the learner and the system to respond quickly and effectively to changes in the reality. Finally, application of the principle of adaptivity helps the learner and the system to shape the desired and applicable future, and to evaluate its application in advance in a predetermined way. In order to do so the learner must acquire and apply knowledge, approaches and skills that will enable him to act in a world full of changes and to generate personal changes in himself. He must relate to changes as a challenge, sometimes to confront them, to accept them as an opportunity, to display intellectual flexibility and to develop the ability to adapt under conditions of uncertainty. To accomplish this, he must develop and adopt approaches and characteristics of environmental and self-awareness, openness and acceptance, audacity, determination and personal resilience in the face of uncertainty, ambiguity and failure.

The ability to learn and to teach in preparation for a vague and unknown future is a challenge that requires coping with two levels of uncertainty.[16] One stems from the complexity of the modern reality, the multiplicity of its components and the numerous and complex interactions it holds. This results in too much information, irrelevant knowledge and difficulty forecasting results due to the many parameters for assessing performance.

15 A. Toffler. Future Shock. (Hebrew edition by Am Oved Publishing). 1972.

16 Barnett, R (2012). "Learning for an unknown Future. *Higher Education Research and Development 31(1), 65-77.*

The second level comes from the changeability of reality, that is, that the descriptions of reality we know change rapidly, are numerous and even contradict each other. This uncertainty creates instability and our grasp on the changing reality can weaken. For example, the changeability of reality leads to open and challenging questions, such as: What is education? What is school and do we need it? What is the teacher and do we need that? Questions of this nature have many possible future responses, which can often be contradictory if we look at them from different moral perspectives. This reality leads to two different educational tasks: The uncertainty due to the complexity of reality dictates to us the task of preparing learners for a world in which they must make imperfect decisions leading to results that cannot be foreseen. The uncertainty stemming from changeability dictates to us the task of preparing learners to succeed in an unfamiliar world that sometimes has no language to describe the reality, with descriptions of reality that are different and varied, and the tools for understanding ourselves and our place in that reality are controversial. One possible solution for this level of uncertainty is to focus learning on the acquisition of generic skills which, by definition, are enduring and relevant to varying and changing situations, even those that are unknown. However, an additional and more effective response to this challenge might be to focus learning on shaping an adaptive personality. In other words, to focus learning on the acquisition of characteristics and relevant personal attitudes that can support effective adaptation to the changing reality, such as believing in oneself, self-confidence, personal motivation, energy and authenticity.

Principle of Self-Integration

Integration refers to complete self-formation, that is, an identity and individual purpose as the backbone and personal compass that help the learner safely navigate the turbulent waves of a changing reality. The concept of self refers to the gamut of one's emotional and physical functioning and the way in which the person is perceived in his own eyes; this is created and supported through constant interaction with the environment. In a reality of many and accelerated changes, the learner needs complete and coherent self-formation that will serve as his personal, emotional and cognitive anchor and compass, guiding his behavior in multiple arenas of activity and association. The principle of integration deals with the learner's ability to shape a complete self that includes a center of gravity and emotional backbone, which will provide him or her with internal resilience, stability and confidence and enable him or her to successfully cope with rapid and constant changes and with uncertainty about the future. The learner's complete self is based on independently shaping a personal identity and personal purpose to form a personally meaningful narrative.

Self-integration in education

Applying the principle of self-integration in education helps learners cope with the challenges of the changing reality and relevance in education in the following ways: First, it drives the learner to develop, on his own, an authentic personal identity that functions as a stabilizing and firm anchor in the sea of trends of the changing reality. Second, it leads the learner to independently

develop an authentic personal purpose that can serve as a personal compass to help him navigate the changing, ambiguous and unfamiliar reality. Self-development of an identity and an authentic personal purpose will increase the likelihood that these will be future-oriented and will serve the learner as necessary. The personal identity and purpose that the learner forms by himself are likely to be authentic, sustainable and more future-oriented than those transmitted externally by the education system as part of his socialization process.

Pedagogic and Organizational Aspects

Pedagogic and organizational aspects of the future-oriented pedagogy model comprehensively define the educational sphere of activity.

These aspects are based on the Creative Classroom Project of the European Union, which was published by the OECD,[17] and the Education 2030 Project,[18] in which we are currently participating.

17 Bocconi, S. et al., (2012). *Innovating learning: Key elements for developing creative classrooms in Europe*. http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=5181

18 http://www.oecd.org/education/2030/

1. **Content and curricula** - Knowledge, content resources used for teaching and learning, and curricula that define the objectives and frameworks for developing learning activities.

2. **Skills -** The cognitive, personal and social skills required in the 21st century.

3. **Learning practices -** The learning methods used by learners to perform learning, the learning experience, and involving learners in designing the learning process.

4. **Teaching practices -** The teaching methods employed by teachers in order to promote learning and to inculcate learners with knowledge, skills and values and personal characteristics.

5. **Assessment practices -** The method for evaluating the learning, including evaluating goals and methods, identity of the evaluators and the assessment tools they use.

6. **Leadership and values -** Characteristics of the leadership and management necessary to lead processes for change, improvement and innovation in all aspects of pedagogy.

7. **Planning and organizing -** The work plan, personnel and budget required in order to support and advance the array of pedagogic aspects.

8. **Connectedness -** Types of connections and associations needed between people, groups, entities, ideas; information and knowledge sources within the education system and in its local, national and international environment in order to promote pedagogy.

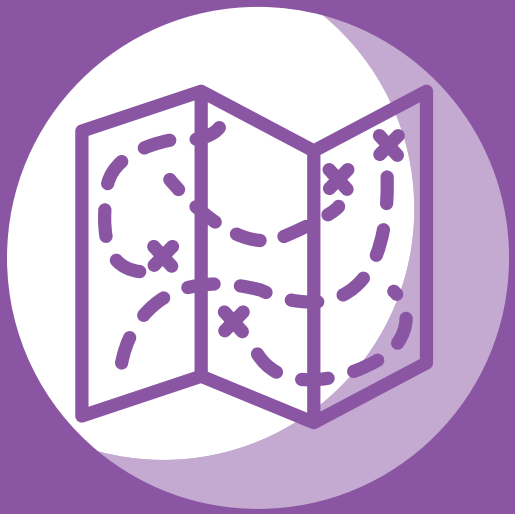
9. **Physical and technological infrastructures -** Physical and technological infrastructures that support and advance pedagogy within the formal teaching spaces and informal spheres of life.

Pedagogical and organizational implications in an era of changing reality

An explanation of the highlighted terms can be found in the glossary at the end of the book.

Component \ Principles	Personalization	Collaboration	Informalization	Glocalization	Adaptivity	Self-Integration
Content and curricula	**Personalized curriculum** The pupil chooses content from a variety The pupil chooses the **learning provider**	Learning the concept of collaboration in various content worlds	**Including informal content in the curriculum**	Teaching languages Global content alongside content that supports a local identity	Incorporating content relating to entrepreneurship and future thinking	Content that promotes personal expression and formulating a personal identity
Skills: Cognitive	**Critical thinking** **Digital literacy**	Ability to negotiate Self-advocacy	**Information literacy** Thinking about and analyzing learning modes Finding learning opportunities	Civic literacy **Global knowledge skills**	**Future thinking** **Risk taking**	**Productivity**
Personal	**Personal competency** **Emotional literacy**	Ability to identify one's own strengths and weaknesses in collaborative situations Empathy toward others	Curiosity Personal responsibility for learning	**Ethical literacy** Empathy for multi-culturalism	**Speed and flexibility (agility)** **Creativity**	**Ability for self-discovery** **Mental and emotional resilience**
Social	Ability to get along with others	**Social literacy**	**Creating informal partnerships**	**Multi-cultural abilities**	**Social adaptability to changing reality** Ethical - social literacy	Debating skills
Learning practices	**Customized learning** **Self-managed learning**	**Collaborative learning**	**Self-learning** **informal learning** Lifewide Learning	**Learning in communal, national and global circles**	**Lifelong learning** **Entrepreneurial learning**	**Reflective learning** **Learning from personal experimentation**
Teaching practices	Personal mentoring Multiple learning strategies to teach learners how to learn	**Cooperative teaching**	**Creating opportunities and directing the leaner to informal learning**	**Teaching practices that integrate global and local spheres**	**Teaching under conditions of uncertainty**	**Personal mentoring to form identity** **Allowing each pupil to experience success**

Principles / Component	Personalization	Collaboration	Informalization	Glocalization	Adaptivity	Self-Integration
Assessment practices	**Adaptive assessment**	**Assessing collaborative process** **Assessing all entities involved in learning**	**Evaluation and accreditation of informal learning**	Assessing glocal skills	**Evaluating the development process and outcomes**	**Self-assessment**
Leadership and Values	Promotes pupils' responsibility and self-management	Promotes a culture of cooperation	**Willingness to integrate formal and informal education**	Promotes **glocal institutional culture**: local, national, international	Adapting the school for the future	Promotes deep educational processes such as values of tikkun olam (repairing the world)
Planning and Organizing: Work plan	Flexible regularity for pupils	Option for collaborative teaching and learning	**Possibility for informal learning**	**Local, national and international components**	A work plan that relates to the future	Allowing the pupil to form his identity and purpose
Personnel	Training staff for individually adapted curriculum	Staff that can engage in collaborative learning and teaching	Staff with **informal learning and teaching** skills	Staff with **glocal consciousness and skills**: local, national and international	Staff that can work in a changing reality	Staff that can support formation of the pupil's identity and personal purpose
Budget	Allocating resources for personal mentoring	Allocating resources to promote collaborative learning and teaching	Allocating resources to promote informal learning opportunities	Allocating resources to promote **glocal learning**	Allocating resources to implement educational initiatives in a changing reality	Allocating resources to promote and formulate identity and personal purpose
Connectedness	Pupils connect with various entities to advance personal learning	School cooperates with the local community and other schools	The school integrates formal and informal entities into the learning process	**School engages in international and multi-cultural partnerships**	Cooperation with various entities in a changing reality	**Pupil connects with entities for forming identity and personal purpose**
Physical & Technological Infrastructures	**Technologies and physical spaces for individually adapted learning and teaching**	**Technologies and physical spaces for collaborative learning and teaching**	Technologies and physical spaces that support informal learning	Technologies and infrastructures that support global learning initiatives	Technologies and physical learning spaces adapted to cope with a changing reality	**Learning spaces that support experimenting and developing identity and personal purpose**



Map of Applications

If we look at the variety of work being carried out by schools in Israel, we can see creative and innovative educational activity that is often consistent with the principles of future-oriented pedagogy.

In this chapter we will present several examples of educational applications that exercise the core components of future-oriented pedagogy principles and are characteristic of education that is relevant to the 21st century. These examples invite educators to discover and even adopt them for their own schools.

Furthermore, this section offers examples of accessible and available digital applications that can support implementation of the principles. The selected applications support the principles with some adaptation, are free of charge, and most of them are in Hebrew.

Personalization

Gevim School, Beersheva

This school employs a system that nurtures excellence, consisting of a weekly lesson on educating for excellence and around 20 excellence groups in different scholastic, artistic and social spheres; these operate during and after school hours. Almost all of the school's pupils participate in at least one excellence group.

Adaptation regarding the principle of personalization - pupils select the excellence groups in which they want to participate, and they must prove their mastery of the relevant knowledge and skills.

In order to enter or continue participating in these groups, pupils receive supervision and guidance from homeroom teachers, as well as mentors from those participating in the excellence groups when necessary.

Mish'olim School, Atlit

This is a growing state elementary school. Learning here takes place around an individualized curriculum, called a "personal learning and development map." At the beginning of each school year the school maps out the child's strengths, interests, knowledge, learning style and social situation, and on the basis of this mapping the pupil, his parents and the school's teaching faculty design together his or her personal learning and development map. The map also defines parameters for evaluating and measuring the pupil's progress towards the goals so that the pupil becomes an active participant in his own assessment and knows what is required of him and what will be considered as success. During the school year the evaluation and measurement are formative, and sometimes this leads to changes in the map, in learning paths, and even learning goals.

Every pupil has an adult mentor who supervises him and his progress with the personal learning map. Additionally, all teachers at Mish'olim have their own personal learning and development maps, and the schedule provides time and space for their own development, to create learning materials and study environments, and for this they also receive personal mentoring from the principal.

IEP – In special education there is an Individualized Education Plan for each pupil

An official document describes the individualized education plan (IEP) for the pupils and what is required in order to carry it out, based on continuous in-depth assessment throughout the child's schooling. The IEP includes:

- Goals for the pupil for different time frames;
- Updated documentation of the pupil's knowledge, skills, strengths and special needs;
- Entities that are involved;
- Teaching and learning strategies appropriate for the child;
- Methods for assessment, diagnosis and measurement.

The "Big Picture" in Israel

This educational model was developed in schools in the United States and is presently being adopted in Israel. These schools encourage individual adaptation of education to the pupil's desires and abilities. The Israeli model is called "Hat'chala" (a Hebrew acronym that stands for Experimenting / Mentoring / Learning) - developed by the Democratic Institute and JDC-Ashalim). Each pupil has a personal advisor and at least once a week the pupils learn in a place of work, and are evaluated according to the authentic standards of that workplace. Parents, teachers, personal advisor and the mentor at the workplace become a community that supports the success of the pupil's IEP.

Personalization – available digital tools

Differential learning environment

Time to Know - a digital environment that enables the teacher to implement differential and individualized learning.

- Time to Know

Personal learning environment (PLE), and mainly cloud services

- Google Drive
- Dropbox
- One Drive

Learning management systems (LMS)

- List of suppliers authorized by the Education Ministry for learning management systems

Personal invention technologies for pupils

- Makey Makey - a kit that enables each pupil to design personal interactions between physical objects and a computer.
- This system can be used with Scratch

Games generator for teachers

- TinyTap

Collaboration

Octet model – Yuvalim School, Beersheva

This school has a work model that breaks up homeroom classes into smaller groups (of 6-8 pupils) that serve as a framework to support and encourage learning, as well as a social group.

Adaptation to the principle of collaboration - the octets are heterogeneous groups of pupils selected according to the differences between them in level of learning, abilities, strengths, etc. Work in the octet takes place during lessons, breaks and even after school hours, which enables the children to develop activity skills and collaborative work. The outcomes of the pupils' work (learning, creativity, volunteering) are group outcomes rather than individual results. The school has developed a unique assessment and feedback network used for both group and individual evaluation as part of assessing the group activity.

In the pedagogic dimension, each class is divided into heterogeneous groups of 6-8 pupils at the beginning of the year, each group with its own name and identity. The octet becomes the pupil's primary affiliation group. The pupils work as a group during lessons and breaks, on trips and at social events. The cohesive group doesn't leave any child out, each one feels that he or she is visible within a supported and safe framework. The drive for success expands and pupils strive for group success, not just individual success. The feeling of unity, responsibility and collaboration is carried over into other

spheres as well. The octet undertakes social projects, such as adopting younger classes, active recesses and activity within the community.

With regard to fostering staff development, the educational staff invests a great deal of attention and consideration in placing pupils into the heterogeneous groups in terms of their level of learning, skills and abilities, so that they are able to help each other, and teachers work throughout the year to make sure they become a cohesive group. Applying the result of working with the octets requires special staff assessments. Giving up on centralized learning creates concerns relating to loss of control and requires flexibility in designing lessons plans and adapting to a varied learning pace.

In terms of organization, lessons have been grouped into clusters by subject, in order to make it easier for teachers to work with the octets in the classroom. During staff meetings and when designing lesson plans, the teachers also work according to the octet model.

Circles of affiliation and influence, Division for Gifted Pupils

The vision of the Division for Gifted and Outstanding Pupils links nurturing the pupils' individual abilities with education for social and ethical commitment. The Division supports this sphere in national and local programs dealing with expanding the pupils' circles of affiliation and influence as an integral part of the nurturing programs.

Among the various programs in which pupils take part through the Division's settings and frameworks is the "Regional Responsibility" program, for resolving issues within local authorities and in the country.

In this program the pupils engage in ethical issues with the aim of leading cultural, social and cognitive change throughout Israel in connection with concepts of the common good, statehood, the public sector and public responsibility; nurturing a sovereign model state based on ethical, moral, transparent and efficient public service. The program includes project-based learning and applying what has been learned to a long term project in cooperation with the municipality or the regional or local authority. "Regional Responsibility" also collaborates with the "Israel Responsibility 2048" organization.

Among the other partners in this program: Council of Youth Movements, pre-military preparatory programs, Year of Service programs, Israel Association of Community Centers, Student Association at Tel Aviv University, Faculty of Public Policy at Tel Aviv University.

This program is a springboard for building a joint practical program for the various organizations in order to make society better. It enables people to become familiar with different circles and sectors, such as pupils with the public sector. One of the program's added values is encouraging gifted and outstanding pupils to become involved in society and the country and to become acquainted with the public sector and its importance, with a perspective of public responsibility and national affiliation.

The program enables the individual to contribute and to express himself in a heterogeneous group, and to reach a shared group outcome. Participation in the program is a suitable jumping off point for developing interpersonal and group skills.

Collaboration – available digital tools

Padlet - a shared board that allows users to share digital notes within the class while learning, and outside the classroom as well.

Facebook - this social network can become a learning social network to serve as an arena for sharing opinions and thoughts. Through Facebook you can create a closed group, and even a secret group.

Google Drive - working together on documents is the highest level of collaboration.

To Be - a platform for creating collaborative role playing that pushes the pupils to cooperate while learning, in order to succeed at the game based on an educational topic.

Guide to Involving the Public - a handbook for involving the public in the government's work.

Informalization

Amal Shevah Mofet High School, Tel Aviv-Jaffa

This school has instituted multi-disciplinary learning based on subjects that are relevant to the pupils' own lives.

Adaptation to the principle of informalization - The school encourages pupils to use contemporary technologies that are found within their daily reality, as part of their learning assignments in various subjects (such as Bible and history). The use of technological skills that already feature in their lives but are also part of the high-tech world (for example, creating and using cell phone apps) is valued and helps the students reach significant scholastic achievement.

In terms of pedagogy, the schools has multi-disciplinary learning strips where the pupils participate in four or five projects during the year. While learning and working on the projects the pupils meet with "mentors" and experts from industrial sectors and high-tech companies, and they are also exposed to current ecological, cultural and social needs surrounding these topics.

The project format includes a technological platform, which is a foundation for collaboration and original creativity that has social and environmental value. Pupils learn to work with a variety of technologies, from information searches to creating original products, such as photography and video editing, designing online posters, producing online books, publishing digital newspapers, and more.

With regard to staff development and support, the school's teaching staff has broken the mold of frontal teaching, as the teachers serve as moderators to aid in learning rather than as sources of information. The teachers undergo training and special in-service courses on technology as a springboard to innovative pedagogy.

Kanaf Democratic School, Eli Ad

This school operates according to the "Sudbury Valley School" model from the USA. It is based on a pedagogic approach that children will learn by themselves and will educate themselves. In their view each person learns on

his own each day and we need to trust the individual that based on totally free experimentation (within the boundaries of physical safety or hurting others) he or she will learn in the broadest and deepest way. The child decides which space to be in, what he will learn and how, without any adult intervention. The assumption is that with independent and informal learning the children will learn until he cannot absorb any more due to fatigue. Curiosity, the need to learn, questions and the search for answers are infinite within human beings, and especially among children in school. In view of this, we must provide them with independence and learning space. In the Kanaf Democratic School pupils from kindergarten through high school are free to explore the world, each one at his or her own pace and in their own way. Through activities that they initiate themselves they acquire basic skills and learn to take responsibility, to set priorities, to allocate resources and to work with others in a vibrant and supportive community. Pupils enjoy total intellectual freedom and free interaction with other pupils and the staff, while taking individual responsibility for themselves.

Each pupil determines his own schedule according to his desires and areas of interest. There is no schedule of hours and no obligation to participate in the various activities taking place in the school. Learning happens everywhere all the time at the school. The children identify and choose the experiences they will have, which constitute learning for them, and according to the school's rational this methodology promotes learning skills.

In the pedagogic dimension, the pupils, almost exclusively, are the ones who design the learning content and methods, and the pace. Implementation of this approach radically changes the role of the teacher, the teaching practice and learning practices.

In respect of staff development and support, faculty members need to work in close cooperation in order to supervise the pupil in an inclusive manner. Furthermore, since the pupils chooses his learning spheres and methods, we can assume that the teachers must cooperate with entities outside the school.

From an organizational perspective, this program demands significant organizational flexibility. The ability to maintain the school's framework, while being responsible for the pupil's welfare and learning and allowing for informal learning, requires a flexible organizational framework but with clearly defined rules.

Informalization – available digital tools

Augmented reality

Applications that enable users to augment the physical environment inside and outside the school with rich information. This type of augmentation allows the pupils to experience incidental and exploratory informal learning.

- Aurasma

Content portal for independent learning

Independent learning of subjects enables each learner to engage in informal learning and to develop in a variety of directions that interest him.

- Khan Academy

MOOC

Massive open online course - A pupil's ability to study by himself, at anytime and anywhere, thousands of rich and varied content subjects, invites informal learning. Thousands of MOOCs are presently available in cooperation with the world's leading universities.

- Coursera or EDX

Virtual Museum

The ability to virtually tour hundreds of museums and cultural sites gives learners a cultural and visual paradise of informal learning.

- Virtual tours of dozens of museums throughout the world (courtesy of Google)

Content archiving tools

Personal content archiving is a vital tool in the age of rich and varied informal learning that takes place in the virtual space.

- Evernote or Pinterest

Glocalization

Neve Shalom – Wahat al-Salam School, Neve Shalom

This is a bi-national, bilingual and multi-cultural school that strives to give expression to Arab-Israeli human diversity at its best, based on values of equality, respect and friendship between two peoples and while maintaining the personal and national identity of everyone who comes there.

Adapting to the principle of glocalization - The school offers frequent and regular encounters between Jewish and Arab pupils. Pupils study both Hebrew and English as native languages, as well as the society, culture and traditions of both nations, Jewish and Arab, as a central pillar in the school's curriculum. During social studies lessons discussions are held on current events with sensitivity (particularly when tension runs high), tolerance, cooperative skills and critical thinking.

In the pedagogic sphere, both Arabic and Hebrew are taught as native languages to pupils during a schedule that is evenly divided. Studying the culture and traditions of both peoples, Jewish and Palestinian Arab, is a key pillar of the school's curriculum. In addition, maximum attention is given to teaching about all three religions, their values and central figures, through cooperation.

Regarding staff development and support, the school's teachers must undergo training in paired teaching, since about 60% of the teaching hours are taught by a pair

of teachers. In language classes, both teachers are of the same nationality and are native speakers of the language being taught (Hebrew or Arabic). In classes relating to culture and tradition there is representation of both nationalities and cultures. The teaching staff must be very familiar with each other's cultures.

In the organizational dimension, the school has realized, in practice, the community commitment. The school community consists of circles: The school faculty, pupils' families, and families of the entire "Neve Shalom" village, which is the school's real and ethical home. These circles share a joint vision of life and the school is, for them, a center for meeting and action.

EMIS – Eastern Mediterranean International School, Hakfar Hayarok

At the Eastern Mediterranean International School (EMIS) pupils from dozens of countries learn in a boarding school setting. The school awards an international diploma from the International Baccalaureate, by following a curriculum that is used in about 147 countries around the world. The program has a significant academic flavor, yet teaches values of respect, diversity and global citizenship. All pupils participate in programs outside of the school community.

One of the school's self-imposed missions is to turn education into a force for promoting peace and sustainability in the Middle East.

In the pedagogic sphere, the school offers its graduates an International Baccalaureate diploma. The pupils engage in research-based learning, they deal with global issues using scholastic materials that reflect local issues, and glocal citizenship is reflected in the school's pedagogy and the subjects taught there.

In terms of staff training and support, teachers work according to values of sustainable environment, equality, mutual respect and the importance of cultural diversity. The faculty consists of teachers of different nationalities and who speak different languages.

Regarding organization, the school's schedule reflects its belief in research-based learning, which includes encounters with the community outside the school. Classes are taught in English. The fact that this a boarding school necessitates suitable organizational arrangements.

Glocalization – available digital tools

Multi-cultural social network

A community-based arena for educational encounters between learners located in places that are both physically and culturally distant.

MOODLE: The social components of the Moodle management system (of the Education Ministry) allows schools to use this multi-cultural social network.

Virtual worlds

This is an arena for potential meetings between learners in different locations around the world and enables multicultural encounters based on learning activity.

- Second Life Education: A 3-dimensional shared learning space in which each learner is represented by an avatar (an imaginary figure that represents each person).

Multi-cultural multiplayer games

- Game for Peace: An Israeli organization that supports multiplayer online games that promote peace.

National and international programs for shared learning

- TEC4Schools

Simultaneous translation

Translation of spoken language in real time:

- iTranslate
- Skype

Adaptivity

Tikkun Olam: Future Thinking and the Singularity Project – ORT Givatayim

This is an innovative pedagogic project that takes place over three weeks and includes lectures, hands-on learning and social initiatives by the pupils.

Adapting to the principle of adaptivity - Pupils are exposed to innovative and future-oriented content that is not related to the subjects they learn in school. The peak of the initiative is the projects that pupils create whose outcomes have social and community importance. During the project, teachers act as facilitators during the learning process.

In the pedagogic sphere, the project gives pupils a chance to disconnect from school and the curriculum for three weeks. The period starts with lectures by national and international experts on various subjects that are not directly related to the subjects taught in school on a daily basis. The project continues with a hands-on curriculum that takes place outside the school building, in museums, academia and high-tech companies. The highlight of the project comes during the week when the pupils work in groups using the tools they have learned and develop initiatives, ideas, projects or various applications. At the end of this enjoyable activity, there is an exhibition and presentations to parents, teachers and businesspeople.

In terms of staff development and support, pupils participate in a seminar as part of the process to help change the perception of the teacher's "role," where pupils are asked to choose an interdisciplinary subject out of all the topics to which they have been exposed, and to create an initiative that will benefit the community. The teacher learns to surrender his or her traditional role as "the keeper of knowledge" and to become the facilitator in learning process taking place in areas of uncertainty.

In terms of organization, the school must recruit lecturers and experts and coordinate a series of visits with a hands-on curriculum that takes place outside the school.

Leveling the administrative pyramid – Dror Educational Campus, Bnei Dror

The school believes in administrative autonomy, self-management for teachers and pupils, and creating a less centralized organization to create better mechanisms for adapting to the changing reality so as to preserve its educational objectives. As an educational institution that acts as an autonomous organization there is a rapid and independent local process of adapting to the dynamic reality. In parallel with the school administration, there is a mid-level management network. Each administrative level has the ability and autonomy to outline policy within the area of its authority. These administrative levels are responsible for subject areas and coordinating grade levels. They are the ones responsible for setting goals, being familiar with the pupils and their life cycles, and for finding educational solutions to match their needs. The school is proactive in responding to our changing reality and creates organizational adaptive mechanisms to help the school cope with the fast-paced changes in reality while maintaining its educational objectives.

In terms of its staff and pedagogic spheres, the school recognizes that achievement depends to a large extent on the learner's own individual functioning. As such, it provides pupils and teachers with tools that enable them to be self-managing and become proactive in directing the process, while assuming personal responsibility for the outcomes. The teacher manages the classroom according to a set of goals and uses a variety of pedagogic methods that he or she chooses. As part of the schools teaching staff the teacher develops learning processes on the basis of feedback from the field and implements them in the classroom. The pupil is also given tools for self-management - he maps the challenges facing him, sets goals, chooses among alternatives and manages the learning process that he, himself, has helped design. At the end of the process the learner receives feedback on how he has managed and implemented the process, and then continues on to the next goal. Teachers also prepare their own yearly work plans according to this model.

With respect to the organizational aspect, the school functions as an autonomous organization with a rapid and independent local process of adapting to the dynamic reality. Great emphasis is place on system flexibility, pooling resources and the ability to develop independently.

The teaching staff is free to choose assessment methods, teaching and learning methods, budget management, human resources, infrastructures and the like.

Adaptivity – digital tools available

Tools for investigating trends (surveys)

The survey stage is the first step in futures investigation.

- Google Trends
- Gapminder

Scenario games (forecasting)

Scenario games allow a player to examine the array of possible futures.

- Wild cards: A group game for creating futures scenarios for a variety of objectives.
- SimCity: Enables the payer to build a city on the basis of a long series of decisions he has made and to observe the scenarios resulting from those decisions.

Tools for formulating a vision – designing the ideal future

- Wiki - this can also be used as a tool for a collective discussion to design the ideal future.
- Wiki can be created within Moodle. It is also possible to use one of the free sites where users can create a Wiki, such as Wikia.

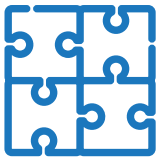
Tools for planning the ideal future

- 3-D printing: This requires purchasing a 3-D printer and working with 3-D object design software, such as Tinkercad.

Tools that promote agility

Computerized adventure games put players into situations that involve significant elements of uncertainty.

- Wolfquest: An online adventure game (quest) that traces the lives of wolves in Yellowstone National Park and enables players to live the life of a wolf in order to survive and multiply.



Self-Integration

Knowing yourself as a learner – Ben Zvi School, Nes Ziona

The school has designed unique teaching plan that supports the development of a pupil's individual identity and maximizing their academic, emotional and social skills as fully as possible. The curriculum includes cognitive and reflective tools that were designed to enable the learner to know himself better and to navigate his own life to the places that are best suited to him and his abilities.

As part of their studies, pupils are exposed to tools that develop their ability to observe themselves and their motives for learning, and perfecting skills such as reflection, organizing their thoughts and spatial thinking that will help them formulate a complete "self."

In all subjects the curriculum aims to give the learner tools that will provide him with support, protection and personal competency, and will help him feel safe and secure, so that he is free to concentrate on learning. The purpose of this is to develop the learner's individual capabilities, to initiate internal motivation that does not depend on rewards or external pressure, to stimulate curiosity and develop scholastic competency. The various aspects of the child's life - scholastic, emotional and social - all come together in school such that each has a reciprocal influence on the other.

On the pedagogic level, the school has developed an effective curriculum with four pedagogic principles - engagement, platform, support and reflection - that are part of every aspect of school life and are used by teachers in every part of their teaching. To support this curriculum tools were designed for self-knowledge and observation, creating a stable, individual curriculum based on choice and consideration. These tools are an integral part of the various lessons.

Regarding staff development and support, teachers are trained according to the pyramid model: the base of the

pyramid features the pedagogic and pragmatic tools, above these are the principles, and at the top of the pyramid is the approach and vision. The range enables teachers at varying levels of readiness to be involved in the processes, to the degree that suits them. These training processes help produce the necessary expertise in order to anchor the model and ensure the expected clarity of action and teacher teamwork, facilitating diversity and creativity among the teachers.

In terms of organization, the school has created many enrichment spaces that give expression to individual and group experiences. The spaces serve as a multi-age platform for developing skills and self-expression, and promoting involvement, initiative, responsibility, inclusion and sensitivity to others.

Cultivating people with value and meaning – ORT BaMa'ale, Tiberias

As an educational living space, the school believes in an approach that cultivates people as having value and meaning. In order to realize this approach, the school promotes a process of individual education and empowerment in which each individual designs a picture of his or her future within society in this dynamic and changing era. The school strives to develop the individual in a time of change through educational programs that aim to empower each pupil to maximize his or her abilities in a reality where significant changes are taking place.

In the pedagogic dimension, the staff must undergo in-service training, and must experiment and develop learning and teaching processes that are suited to the spirit of this educational approach. Scholastic subjects at the various grade levels are designed in a way that enables the learner to have value and meaning.

With regard to staff development and support, the teachers are trained to guide and supervise the pupils (as opposed to teaching in a classroom). The teacher mentors the pupil along his journey to formulate meaning, plan his activities, the process of carrying them out and the pupil's own reflection of himself and his environment. The school enables him to do this by allocating teaching hours as well as hours during which the teachers remain in school together and can communicate regarding the support of particular pupils.

As for organization, this pedagogic approach demands system-wide organization, both in terms of integrating a system of content that crystalizes meaning, and in terms of helping teachers serve as guides and facilitators for pupils in their personal-pedagogic journey.

Self-Integration – available digital tools

Health as a key for navigating life's challenges

Smiling mind: This is a mindfulness application that empowers pupils, teachers and parents through a tool for meditation and proactive treatment for mental health and well-being. The developers believe that young people need to learn skills for building a healthy mind and to obtain tools for navigating life's challenges using this tool.

Summary

"Take, and Make It Your Own!"

The second edition of the book "Future-Oriented Pedagogy," presents updated future trends for a range of ten years into the future, in a variety of life spheres: society, technology, economics, the environment, politics and education in Israel and around the world. These trends are characterized by the interest and challenge they generate for the education system, for example, in the need to develop global and multi-cultural skills (a topic that will be tested in the PISA 2018 exams), developing skills for entrepreneurship, creativity and critical thinking (which will be tested in the PISA 2021 exams), and skills that highlight and empower individual and organizational ability for adaptation and flexibility. This means that one of the greatest challenges facing the education system is to provide a framework that enables and supports these developments.

The model for future-oriented pedagogy has been updated, and it is now broader and more in-depth, focusing on six core principles: personalization, collaboration, informalization, glocalization, adaptivity and self-integration. Given the momentum of innovation that characterizes the system and the extensive interest in personalization and individual adaptation, the future-oriented pedagogy model is an ideal platform for development system-oriented approaches while providing creative, contemporary and sustainable solutions. Furthermore, the book's presentation of existing initiatives and digital tools that are compatible with the principles allows us to advance the core

principles, reduce the gap between the challenges facing the system and the prevailing opportunities, and enables the system to re-emerge from what presently exists.

In an age where everything changes so rapidly, understanding the trends around us and the ability to turn a trend into a principle for action helps us grasp the greater picture, and to grow within it. For this reason, this second edition of the book features an entire chapter on applicable tools that can help an organization, product, process, or environment adapt to and promote future-oriented pedagogy. The readiness model is a tool that can diagnose and advance the organization to become future-oriented.

The second edition is appropriate for a wide range of stakeholders in education: teachers, principals, supervisors, head office units and education divisions, teachers' colleges and universities, educational entrepreneurs, colleagues from other nations, those who dream and those who act.

The Research and Development Division continues to investigate, update and make future-oriented pedagogy accessible. We are writing reports about future trends based on demand, such as the urbanization report, and a future report on cultural competence. We are engaged in continuous discussion with Israel's leading educational R&D entities through a federation of educational R&D entities that we established this year; we are monitoring programs for building and developing innovative future-oriented environments (the results of this monitoring will be presented and published in the third edition); and we are working to become part of the OECD 2030 Program.

But primarily we look forward to a continuous discussion with you, our readers and education leaders in Israel.

" When I pronounce the word Future, the first syllable already belongs to the past. "

Wisława Szymborska, from
"The three oddest words"
Translated from Polish:
S. Baranczak & C. Cavanagh

Appendix

Glossary of pedagogic & organizational aspects

Pedagogic aspects

Content and curricula

Learning providers - content and learning services, mainly online, such as Coursera, Kahn Academy.

Integrating informal content into the curriculum - for example, using professional magazines, visits to cultural events, museums, etc.

Individualized Education Program (IEP) - a curriculum that has been adapted to the learner's individual needs and desires.

Skills

Cognitive skills

Civic literacy - the ability to understand processes, to exercise civil rights and obligations and to participate and contribute to civilian life at the local, national and international levels.

Digital literacy - the variety of technical, cognitive and sociological skills needed to perform tasks and solve problems in digital environments.

Information literacy - the ability to identify the need for information, to locate and gather information, to assess information, to analyze and interpret the information and present it in a meaningful way.

Critical thinking - the ability to examine phenomena, ideas, outcomes and products on the basis of rational criteria in order to intelligently prioritize facts and certain opinions over others, and to be prepared to doubt these as well.

Futures thinking - the ability to investigate possible futures in order to design a desired future, and to work in order to realize it in the present.

Productivity - the ability to produce things.

Global knowledge skills - communication and cooperation skills, pooling resources, "friendly competitors" (competitors who cooperate with you), innovation, creativity, system-oriented thinking.

Risk management - the ability to find, assess and prioritize possible risks and formulate ways to prevent them from happening or mitigate the damage they cause.

Personal skills

Ethical literacy - the ability to identify and effectively navigate the field of unknown values and moral dilemmas.

Emotional literacy - intellect and insights in human relations, such as honesty, reliability, sensitivity, morality, compassion, affection.

Agility - flexibility and speed - the ability to adapt and act in a changing reality

Mental and emotional resilience - personal energy, coping with uncertainty and recovering from failure, the courage to try, perseverance, determination.

Ability for self-discovery - self-awareness and self-examination of strengths and weaknesses, desires and passions, and striving for excellence.

Creativity - ability to create new ideas that are original and worthwhile, and new and original ways to implement things.

Personal competency - self-confidence, self-awareness, responsibility and self-discipline, intrinsic motivation.

Social skills

Social literacy - group organizing, persuasive ability, negotiating skills, conflict management, mediation

Social adaptability in a changing reality - skills that require acceptance, inclusion, sharing, defending and safeguarding privacy

Multi-cultural skills - understanding other cultures and the ability to cooperate with them on the basis of dialogue and mutual respect.

Learning, teaching and assessment practices

Learning practices

Informal learning - learning that takes place outside of formal educational frameworks and without their direction, guidance, control and assessment.

Learning in community, national and global circles- leveling and removing the physical, organizational and cultural borders of the classroom to create shared learning and partnerships, both online and offline, between the class and a variety of entities within the school and outside the school in the community, the state and the world.

Self-managed learning - learning that is managed by the learner himself, who defines and manages the objectives, goals, content and nature of the learning, monitors assessment methods, learning providers, and so on.

Entrepreneurial learning - learning by conducting initiatives along the spectrum between concept and implementation.

Lifelong learning - learning that takes place throughout one's lifetime.

Customized learning - the learner participates in choosing personal learning practices using technological systems to monitor learning and/or through shared direction with the teacher.

Learning through personal experience - learning through hands-on experiences that challenge and enrich the learner physically, socially, cognitively and emotionally, such as learning through play, investigative learning, and the like.

Independent learning - learning that takes place without direction and guidance from any other entity and includes various components, such as curiosity; the ability to choose, plan and perform; analysis, time management and organization - through constant assessment and improvement.

Reflexive learning (learning about learning) - learning through self-observation. The learner reflects the learning processes he is experiencing in order to enhance his awareness and to develop his abilities over time.

Cooperative learning - learning as part of an actual or virtual group, that allows participants to connect on the basis of shared interests, cooperative problem-solving, accelerated learning for pupils with difficulties, developing social skills among strong pupils and enabling expression of different types of intelligences.

Teaching practices

Teaching in uncertainty - teaching where the teacher has no advance knowledge regarding the nature of the field of learning or where he is working to initiate

ongoing change in the learning environments so as to create uncertainty and ambiguity for the pupils.

Cooperative teaching - cooperation among teachers with different specializations in planning and implementing interdisciplinary teaching.

Individual mentoring for identity formation - defining the teacher's job includes an array of roles as individual mentor, which includes attention to a variety of aspects of the pupil's life.

Creating opportunities and directing learners towards informal learning - enriching the environment within the school and spaces relating to life outside the school with learning opportunities. Directing the learner towards opportunities for formal and informal learning, turning experience into learning.

Creating success for each pupil - by using a variety of ongoing educational and emotional experiences.

Teaching practices that integrate global and local spheres - giving a local interpretation to global components, and vice versa.

Assessment practices

Assessment and accreditation of informal learning- evaluating informal learning achievements for the purpose of granting formal accreditation.

Adaptive assessment - assessment that adapts itself to the characteristics of the learner's personal learning progress.

Self-assessment - assessment that is performed, and sometimes even planned, by the learner himself.

Assessment by all entities involved in learning- evaluation carried out by a variety of relevant stakeholders that are connected to the learner being evaluated (teachers, peers, specialists, etc.).

Assessment of glocal skills - assessing glocal and multi-cultural content and skills, such as languages, global economic knowledge and literacy.

Assessing the development process towards outcomes- evaluating the outcomes of creative learning that are not defined prior to learning.

Assessing the cooperative process - evaluating the cooperative learning process, and not necessarily the final outcome.

Organizational aspects

Option for informal learning - human or computerized centers working around the clock and providing learners with support by telephone or through online social networks, in order to promote informal learning.

The school as a future-oriented organization - based on futures trends, working to advance professions of the future and prepare the pupil for the future work of employment, acting as an adaptive organization that applies FOP principles in a process that is continuously improving.

Connecting the pupil with identity forming entities and personal purpose - connection at school and in the community to spheres of interest such as culture and tradition, leadership, cultural historic events, and so on.

Futures thinking - the ability to investigate possible futures in order to shape the desired future and work to realize it in the present.

Technologies and physical learning spaces adapted to cope with a changing reality - spaces and furniture that can be changed, escape rooms, dynamic augmented and virtual reality spaces.

Technologies and physical spaces for individually adapted teaching and learning - laptop computers, cloud computing, individual learning environments.

Technologies and physical spaces for cooperative teaching and learning - shared boards, environments for managing shared screens, cooperative learning spaces.

Ability for shared teaching and learning - defining and applying peer learning roles, pedagogic coaching for shared learning, organizing for online learning.

Learning spaces that support experience and development of identity and personal purpose - physical and online spaces that enable experiences in a changing reality to serve as a springboard for meaningful and purposeful self-formation, for example, physical spaces for creativity, art and sports; augmented and virtual reality; collaborative technologies and multiplayer gaming.

Local, national and international components - that refer, among other things, to multi-cultural aspects such as holidays and languages.

Flexible regularity for pupils - flexibility that is reflected in the class schedule and recesses, the start and end of the school day, and flexible use of existing spaces.

Readiness to integrate formal and informal education - at all levels of the education system, reflected in preparing to advance them, to integrate them into formal learning, and to formally recognize their outcomes.

Acquiring content and local and international training - integrating international and local curricula, teacher exchanges, budgeting for collaborative developments and adaptations from around the world, and outside.

Using informal opportunities and environments - an organization that sees each individual as a unique and valuable juncture within the organizational network and enables individuals to organize into lateral partnerships to promote organizational and system-oriented objectives.

Extensive partnerships - between the various streams in Israel's education system, with the local community and international educational bodies, using advanced technologies to bridge the gaps of physical distance and cultural barriers.

Glocal skills and consciousness - choosing a diverse and heterogeneous teaching staff, professional development that supports multi-cultural abilities and languages.

Tikkun Olam (Repairing the World) - applying a policy of social and civil involvement and responsibility, such as enlisting learners to improve society, volunteering and donating to the community, personal and social leadership, commitment to preserve nature and the environment.

Glocal institutional culture - encouraging innovation in the sphere of glocal education, familiarity with and respect for other cultures in the state and outside of Israel.


Direct
Envision
Illuminate
Anchor
Navigate
Observe
Take, and make it your own
Lead
Implement