The Initiative for Applied Education Research
The Israel Academy of Sciences and Humanities

Pedagogy in the Information Age

Symposium Report

Executive Summary

October 2011

Coordinator and Editor: Ofra Brandes

The Committee to Develop a Proposal to Revamp Israeli Schooling for the 21st Century

Jerusalem, 2012

The Initiative for Applied Education Research
The Israel Academy of Sciences and Humanities
The Committee to Develop a Proposal to Revamp Israeli Schooling for the 21st Century

Pedagogy in the Information Age

Symposium Report

Executive Summary

October 2011

Coordinator and Editor: Ofra Brandes

Jerusalem, 2012

Language Editor (Hebrew original): Nili Eden
English Translation: Judyth Eichenholz
Graphic Design: Esti Boehm

ISBN – 978-965-208-195-7

Use of or quote from this document should cite the source as follows:

Brandes, O. (Ed.) (2012), *Pedagogy in the Information Age, Symposium Report*, Jerusalem: The Committee to Develop a Proposal to Revamp Israeli Schooling for the 21st Century, The Israel Academy of Sciences and Humanities.

The Israel Academy of Sciences and Humanities was founded in 1959. Its membership currently comprises 98 top Israeli scientists and scholars. The Israel Academy of Sciences and Humanities Law, 1961, declares that the Academy's principal objectives and tasks are to foster and promote scientific activity; to advise the government on research activities and scientific planning of national importance; to maintain ties with foreign academies of science; to represent Israeli science at international institutes and conferences; and to publish articles that can further science.

The Initiative for Applied Education Research (the Initiative) places up-to-date, scientific, critically-appraised knowledge and information at the disposal of decision-makers in the field of education. Such information is crucial for intelligent formulation of policy and optimal planning of interventions to improve educational achievement in Israel. The Initiative addresses issues raised by decision-makers and consults with senior Ministry of Education officials and other stakeholders. The Initiative's steering committee, appointed by the president of the Israel Academy, is responsible for the Initiative's agenda and the peer-review process of the reports and documents it creates.

The Initiative operates by means of expert committees and by convening joint symposia for researchers, professionals in the field and decision-makers. It publishes a variety of reports and makes them available to the public.

Members of expert committees carry out their work on a voluntary basis.

History of the Initiative: The Initiative was established in late 2003 as a joint venture of the Israel Academy of Sciences and Humanities, the Ministry of Education, and Yad Hanadiv (the Rothschild Foundation). Yad Hanadiv, which conceived the idea of the Initiative, provided much of the funding during the initial years of its operation. Since the beginning of 2010, the Initiative has been operating as a unit of the Israel Academy.

In the summer of 2010, the Israeli Knesset amended the Israel Academy of Sciences and Humanities Law, regulating the Academy's advisory role vis-à-vis government ministries seeking its consulting services. The Initiative directs the consulting activities on education-related issues which the Israel Academy provides to the government and various authorities.

Additional information is available at: http://education.academy.ac.il/english/HomePage.aspx

The Committee to Develop A Proposal to Revamp Schooling for the 21st Century

In response to a request made by Dr. S. Shoshani, outgoing director-general of the Ministry of Education, an expert committee was established in 2011 to investigate options and possibilities for reorganizing the education system in Israel so that it adapts to the types of capabilities and requirements the 21st century demands of the system and its graduates. The director-general sought an answer to the following question: **How can the education system prepare today to provide for society's needs in another 18 years?**

The expert committee undertook to review the body of research knowledge in the field and submit recommendations regarding a reorganization of schooling so as to maximize achievements from learning content (subject matter), competencies, skills and values.

The committee, headed by Prof. (Emeritus) Menahem Yaari of the Hebrew University of Jerusalem and President (Emeritus) of the Israel Academy of Sciences and Humanities, operates within the framework of the Academy's Initiative of Applied Education Research[1]; it began its work in early 2011. The committee is studying the topic and learning the relevant issues by conducting meetings and deliberations, holding meetings with various experts, and commissioning status reviews and scientific literature reviews.

One of the issues the committee chose to address is the subject of pedagogy in the information age. In October 2011, the committee held a symposium on the topic, open to the public, with the participation of representatives from a range of sectors involved in the fields of education and the pedagogy of education technology.

At the close of its deliberations, the expert committee plans to summarize its findings in a consensual document endorsed by its members including recommendations for reorganizing the education system's practice of teaching and learning. Following peer review, the document will be submitted to the Ministry of Education directorate and made available to the public via the Initiative's website. Publication is expected early 2013. The process of assembling information for the committee's work included commission of scientific reviews, available to the public on the Initiative's website (http://education.academy.ac.il/), in the link to the committee's *background materials*. The public was also called upon to submit opinion papers with reference to values of the education system in Israel and the place of value-based education within the system.

[1] Yad Hanadiv also supports the Ministry of Education's professional connection with the Academy for this purpose.

Committee Members:

Prof. Menahem Yaari (Chair), Hebrew University of Jerusalem; President (Emeritus), Israel Academy of Sciences and Humanities

Prof. Yaara Bar On, Bezalel Academy of Arts and Design, Jerusalem

Prof. Nachman Ben-Yehuda, Hebrew University of Jerusalem

Dr. Hagit Benbagi, Ben Gurion University of the Negev

Rabbi Dr. Yehuda Brandes, Beit Morasha, Jerusalem

Prof. Shaul Hochstein, Hebrew University of Jerusalem

Dr. Adam Lefstein, Ben Gurion University of the Negev

Prof. Fadia Nasser-Abu Alhija, Tel Aviv University

Dr. Samuel Sattath, Hebrew University of Jerusalem

Committee coordinator: Ms. Ofra Brandes, ofra.education@academy.ac.il

Table of Contents

Table of Contents[2]

[2] Table of Contents reflects the contents of entire Hebrew version of the report.

Executive Summary

This report presents summaries of lectures and discussions that took place at the "Pedagogy in the Information Age" symposium, held in October 2011, organized by the expert committee developing "A Proposal to Revamp Schooling for the 21st Century." The symposium brought together educators and public sector professionals, policymakers, local government officials, academics and researchers, curriculum content developers and those active in the Israeli education hi-tech sector. The aim of the gathering was to present a wide-ranging picture of programs and activities that may improve teaching through use of Information and Communication Technology (ICT), to discuss the potential contribution, advantages and limitations of ICT use in schools, to elucidate expectations of ICT processes and accelerate their maturity toward integration and use.

Prof. Yaari, the expert committee chair, delivered the opening remarks. He described the Initiative for Applied Education Research's background and spoke of the symposium's objectives. Prof. Dan Shechtman honored the symposium with his presence and discussed the immense responsibility resting on the shoulders of those in charge of education and its practitioners, and called for a results-based policy capable of assessment.

The symposium was comprised of sessions which gave expression to the different perspectives of three main sectors involved in education: policymakers, educational hi-tech professionals, and academicians.

A. ICT education policy in Israel and around the world

During the first session, positions of policymakers in Israel and abroad were presented. The first speaker was Dr. Ofer Rimon, head of the Ministry of Education's (MOE) Science and Technology Administration and responsible for the nation-wide ICT program implemented by the Ministry, starting in 2011. The program is part of the larger MOE plan to adapt the education system to the 21st century. Its goal is to introduce innovative pedagogy into schools by integrating technology. Dr. Rimon presented the ICT program's vision and conception, reviewed comparative developments in South Korea - considered a leader in the field with reference to performance and achievements, presented the MOE's equipment and budgeting plan and discussed the desired pedagogic outcomes and national ICT infrastructure.

Following Dr. Rimon's talk, Dr. Irwin Jacobs, chairman of the National Academy of Engineering in the U.S. and chairman, founder and CEO of Qualcomm addressed the symposium. Dr. Jacobs is a hi-tech professional who has committed himself to improving the achievements of youth who, due to their socio-economic status, may not be reaching their potential and would not realize high achievements in today's education system. According to the “High Tech High” approach, presented by Dr. Jacobs, special schools are established specifically for this population, where the method of learning is project-based and utilizes personal mentoring in a way that is meaningful to the students. All these activities make use of and rely upon the most advanced technological innovations that Dr. Jacobs reviewed and compared.

Dr. Rimon's and Dr. Jacobs's lectures appear in **Section A** of the report's Hebrew version.

B. Technology in the service of teaching and the "Start-up Nation"

The second session was led by Mr. Eli Hurvitz who presented the contemporary version of the well-know maxim from the book of Proverbs, "Educate each child in accordance with his own way." He pointed out that there is currently a demand that teachers and the education system educate girls and boys in a technologically evolving environment, so that they can benefit from it in an intelligent fashion. Despite Israel's small size, there is a technology industry developing here which is entirely oriented toward educational achievements and objectives.

Participating in the session were representatives of digital-pedagogic content creation organizations that have been working together with the Ministry of Education. In presenting the specific programs they have been developing and implementing, described below, they related to the following questions: How can technology help teaching adapt to the needs and abilities of each student? How can technology in Israel aid teachers' professional (teaching practice) development? How can technology assist school principals to manage teaching and learning? How can technology help parents fulfill an active and useful role in their children's learning? How can the private and government sectors help encourage technology activity in education in Israel, and benefit from it?

Mr. Sharon Greenberg, director of the Internet Technologies unit of ORT Israel's R&D center, presented the ORT teachers' partnership in developing the ORT network's pedagogic content; their comprehensive, in-house developed computerized database; and, teachers' professional development – which has transitioned to the internet and enables teachers to learn in a flexible manner from their homes. The database is accessible to the entire administrative and teaching staffs and permits real-time data delivery which can be used to design the school's and class's education policy. Mr. Greenberg further expanded on the future school, an ORT network initiative being currently developed to address the special needs of today's schools.

In her remarks, Ms. Gila Ben Har, executive director of the Center for Educational Technology (CET), described the new digital-visual literacy program using distance learning, enabling novel and diverse capabilities. Through this program, learning and reading are transformed into active processes, facilitating use of simulations that bring the learner closer to the subject being studied and makes teaching with the aid of experts possible. This also converts the traditional book bag into an "eBag." Ms. Ben Har presented the change taking place in reading and writing habits and the demands this change places on teachers and digital content developers. She also discussed methods of computerized tracking that enable those who set school educational processes to take advantage of education system data in real time.

Ms. Sarit Barzilai, director of the Pedagogic Development Department at the "Snunit" Center for the Advancement of Web-based Learning, presented the "disruptive innovation" model as a factor explaining the changes taking place in the current era of ICT, and their implications. The new disruptive innovation proposes a learning solution which relates to individuals, takes differences between students into account and in its wake, stimulates development of platforms and tools for the creation of study content and development of networks and communities that enable teachers to share content; (this kind of platform

already exists at Snunit). She closed her remarks by raising a number of questions that affect ICT development in Israel and require consideration, among them - questions of assessment of ICT content; whether all teachers can be successfully integrated into innovative environments; and, copyright issues.

The final speaker of the session was Mr. Dovi Weiss, the pedagogic founder of "Time to Know" and the organization's chief scientist. Mr. Weiss spoke of the difficulties facing the education system and its teachers in implementing technology-based pedagogy and in their light, described the essence of Time to Know's activities which propose an all-inclusive and comprehensive solution with characteristics that make sense pedagogically, software tools that enable teachers to express themselves in a manner which suits their style, and management software that permits those in key positions to receive updates in real time. The latter enable follow up by setting action policy in response to system data. Mr. Weiss presented these applications with the aid of a film clip.

The session participants' remarks and a summary of the discussion that ensued appear in **Section B** of the report's Hebrew version.

C. Assessment in the 21st century

The symposium's guest speaker was Prof. Andreas Schleicher, special advisor on educational policy to the OECD's secretary-general for educational policy. In his remarks, he related to measurement and assessment of 21st century skills. From the content perspective, this lecture belongs with the morning sessions in which education policymakers addressed the audience. Prof. Schleicher reviewed the main changes taking place today vis-à-vis educational objectives and argued that studying methods proven to work in various successful education systems around the world can aid in seeing the future of assessment mechanisms. He reviewed PISA data, defined what the test can measure and, using PISA data for reference, listed attributes of good education systems around the world (reading literacy, digital literacy, investment in education, values related to education, computers and online activity, and more). In discussing these attributes, he compared conclusions emerging from the PISA results of various countries (including Shanghai, Luxembourg, Finland, the U.S., Poland, Japan, and Singapore) and reviewed the educational priorities these countries set. Prof. Schleicher listed changes that must take place in education systems so that the skills and abilities required for the future can be effectively acquired. Prof. Schleicher's remarks appear in **Section C** of the report's Hebrew version.

D. Teaching and learning in digital environments: An academic view

In the fourth session, the academic perspective on the topic of pedagogy in the information and technology age was presented. As in the preceding sessions throughout the day, here too, information from Israel and abroad was included, this time, through the use of video-conferencing.

The first to speak was session chair, Prof. Sheizaf Rafaeli, head of the Sagy Center for Internet Research and head of the School of Management at the University of Haifa. Prof.

Rafaeli presented fundamental ideas, which are basic to the discussion about the encounter between technology and learning. In this way he clarified the need to "calibrate the compass" that will show to what this generation aspires and what it wishes to achieve through the use of technology. The critical question he presented was: Does this generation understand the technology it is talking about and does it know how to define its inherent advantageous promise? Prof. Rafaeli listed ten basic concepts that must be recognized and understood so that this basic, crucial two-pronged question can be answered. They include interactivity and wisdom of the masses, mobility, knowledge of and location awareness, flexibility of synchronicity, memory and sharing, the social network and the serious game. Prof. Rafaeli noted that at the rate technology currently develops there is no point in talking about a five-year plan since it is impossible to predict the state of technology within that time-span. The focus should be on technology's significant added value which is peer learning - knowledge sharing among various learning entities and especially, sharing among teachers.

Prof. Anat Zohar of the Hebrew University of Jerusalem's School of Education and the Mandel Leadership Institute pointed to the need to define the image of the desired 21st century education system graduate and examine how the aspiration toward this desired image should impact upon school practice. She pointed out that computerized technology is not a required condition for realizing pedagogic change in the essence of teaching, though it can enable the change to be made more effectively. Research indicates the considerable difficulty in changing teaching and learning methods and very little is currently known about the method for making such changes. Prof. Zohar believes that investment should be made in developing quantitative and qualitative measures of comprehension and depth of thought. If the goal is for the national ICT program's declared policy to be realized, clear objectives and work plans should be defined and evidence of these should be made manifest in teachers' professional development. Beyond this, an atmosphere of trust should be developed and teachers and students should be given the autonomy to be involved in thought- and comprehension-intensive learning.

Prof. Lev Gonick, vice-president for information technology services and chief information officer at Case Western Reserve University, spoke about elements required for cultivating in-depth learning, elements not unique to the information age though they can be used in its promotion. Prof. Gonick listed the most recent technological developments and compared them (smartphones vs. personal computers, video conferencing, serious games, digital textbooks and social networks). He noted that a significant portion of learning takes place outside school and it is worthwhile being alert to and aware of all this implies.

Prof. Marshall (Mike) S. Smith, a member of the U.S. National Academy of Education and a former Undersecretary for Education, noted that despite the fact that no one has any idea of what the connection between technological development and education will be in the coming decades, it is clear that it will occur and will lead to momentous results. Although ICT is not a primary solution but a useful tool, education systems must develop standards for technology use and reform implementation. Prof. Smith listed conditions required for education system success, and what is taking place in a number of branches of technology from where lessons for the education system can be learned (digital textbooks, serious games, multimedia courses and combined use of teachers and technology). He stressed the

limitations of technology, for example in the fields of ethical behavior, mutual responsibility, etc.

The remarks of this session's speakers appear in **Section D** of the report's Hebrew version.

E. Concluding remarks

Two speakers participated in the final session. The first was the Ministry of Education's director-general, Dr. Shimshon Shoshani, at whose request the expert committee was formed, and who was scheduled to retire from the system just several days later. In his remarks, Dr. Shoshani described the process through which the Ministry of Education had gone in integrating technology in teaching, a process being studied by several countries around the world, and the uncertainty in which the Ministry finds itself today. He expressed hope that the various entrepreneurs working in the field will propose and implement ideas that will move the system forward in the field of technology as well.

Summarizing the symposium was Dr. Samuel Sattath, expert committee member charged with organizing the symposium and formulating the program. Dr. Sattath described the process leading to the symposium's format, with representatives from various sectors being invited in the hope that these highly regarded sectors would be able to use their experience to help the education system. Dr. Sattath described the task at hand in terms of organizational change in which ICT is a tool and a means but not an objective in and of itself. He mentioned several of the problems that impede finding solutions and putting them into practice; among them: disagreement regarding goals and objectives shared by all the entities involved at the Ministry of Education, ongoing frustration due to lack of success in the past, dependence upon politics and the change of guard in government-appointed supervisors of the system, the demand to achieve goals rapidly that can be showcased instead of a thorough, structured solution, and the absence of significant research demonstrating the value of ICT in education. Dr. Sattath did, however, present an optimistic picture of wide public commitment to the issue of education and the willingness of many sectors of the public to become involved in the formulation and implementation of real solutions. In his estimation, these solutions will be "Israeli" in nature, grown here in the field and not dictated by a defined policy. Dr. Sattath expressed his hope that to benefit education, the Ministry of Education will cooperate with all sectors of society.

The concluding remarks and summary appear in **Section E** of the report's Hebrew version.

The presentations and videos of the symposium lectures can be seen **here**. We recommend that special attention be paid to the important bibliographical referrals made in the presentations.

Acknowledgements

The committee thanks all the symposium participants.

The committee expresses its gratitude to the speakers, many of whom also assisted Prof. Yaari and Dr. Sattath in organizing and creating the symposium and its program.[3]

Prof. Michal Beller who helped establish the connection with Prof. Schleicher, leading to his participation in the symposium; Ms. Sarit Barzilai, Ms. Gila Ben Har, Prof. Lev Gonick, Mr. Sharon Greenberg, Mr. Eli Hurvitz, Dr. Irwin M. Jacobs, Dr. Ofer Rimon, Prof. Andreas Schleicher, Dr. Shimshon Shoshani, Prof. Marshall (Mike) S. Smith, Mr. Dovi Weiss and Prof. Anat Zohar.

Special appreciation to Yad Hanadiv and to the Israel Academy of Sciences and Humanities for their ongoing support of the Initiative in general, and of the committee, in particular.

To study the issue and become familiar with practice in the field, in the months leading up to the symposium, various committee members met with many representatives from a range of institutions throughout the country involved in this worthy practice. We wish to thank them all and if we inadvertently omitted anyone from among all who supported and assisted us, we sincerely apologize.

We give our thanks to:

Mr. Dror Aloni, Kfar Smaryahu; Mr. Ido Argaman, principal, and the staff and student representatives at Mevo'ot Hanegev School, Kibbutz Shoval; Dr. Ronit Ashkenazi, AMAL Network; Mr. Ofer Brandes, Carmel Ventures; Mr. Shlomo Dovrat, Carmel Ventures; Dr. Eli Eisenberg, ORT Israel; Dr. Yossi Elran, Davidson Institute of Science Education, Weizmann Institute of Science; Ms. Dalia Fenig, Ministry of Education; Col. (Res.) Eli Fishoff, former head of IDF Behavioral Sciences Center and CEO of Pilat; Dr. Avi Golan, Davidson Institute of Science Education, Weizmann Institute of Science; Prof. Haim Harari, Davidson Institute of Science Education, Weizmann Institute of Science; Dr. Ariel Heimann, Davidson Institute of Science Education, Weizmann Institute of Science; Dr. Sara Hershkovitz, CET – the Center for Educational Technology; Mr. Eli Homburg, Snunit; Mr. Eli Kanai, Snunit; Dr. Miri Kesner, Davidson Institute of Science Education, Weizmann Institute of Science; Mr. Guy Levi, CET – the Center for Educational Technology; Ms. Dafna Lifshitz, Tapuah Association; Dr. Rachel Mintz, CET – the Center for Educational Technology; Ms. Sofia Mintz, Ministry of Education; Prof. David Mioduser, Tel Aviv University; Prof. Rafi Nachmias, Tel Aviv University; Ms. Revital Rubin, Snunit; Ms. Yonit Sadan, Snunit; Mr. Eli Varshavsky, CET – the Center for Educational Technology; Ms. Michal Yaacobi, CET – the Center for Educational Technology; Prof. Michal Yerushalmy, University of Haifa; and to the principals of the schools in Ganei Tikva who did their best to help us: Ms. Aviva Balaish, Ms. Galit Bar El and Ms. Carmela Bechar.

[3] See the brief biographical descriptions below.

Many thanks to the staff of the Initiative for Applied Education Research who supported the committee and went to much trouble and effort to arrange the symposium and see it through.

The report was subject to the customary process of independent peer review. The committee appreciates the review as it helps ensure the report's clarity, quality and independence. Responsibility for the accuracy of the report and for the organization of this document however, rests with the committee coordinator.

האקדמיה הלאומית הישראלית למדעים

Symposium Pedag@gy in the Information Age

Tuesday, October 25, 2011
Dan Accadia Hotel, Herzliya

The Initiative for Applied Education Research
Study Committee: A Proposal to Revamp Schooling for the 21st Century

08:30 – 09:15	Assembly, light refreshments and registration
09:15 – 11:00	**ICT Education Policy in Israel and Around the World** Chair: Prof. **Anat Zohar**, School of Education, Hebrew University of Jerusalem and the Mandel Leadership Institute
09:20 – 09:30	Prof. **Menahem Yaari**, Chair, Study Committee; Chair, Steering Committee of the Initiative, President (Emeritus), Israel Academy of Sciences and Humanities
09:30 – 09:40	Prof. **Dan Shechtman**, The 2011 Nobel Prize Laureate in Chemistry. First chairman of the Initiative for Applied Education Research steering committee
09:40 – 10:20	Dr. **Ofer Rimon**, Director, Science and Technology Administration, Ministry of Education
10:20 – 11:00	Information Technology and the Transformation of Education (in English) Dr. **Irwin Mark Jacobs**, Chair, (U.S.) National Academy of Engineering, Founding CEO, Qualcomm.Inc; Education activist and former professor, MIT and UCSD
11:00 – 12:15	**Technology in the Service of Teaching and the Start-Up Nation** Chair: Mr. **Eli Hurvitz** – Executive Director, The Trump Foundation With the participation of: Ms. **Sarit Barzilai**, Pedagogic Director, "Snunit" Center for the Advancement of Web-based Learning Ms. **Gila Ben Har**, Chief Executive Director, Center for Educational Technology (CET) Dr. **Eli Eisenberg**, Senior Deputy Director General and Head, Asministration for R&D and Training, ORT Israel Mr. **Dovi Weiss**, Pedagogic Founder and Chief Scientist "Time to Know"
12:15 – 13:15	Break: Light lunch will be served
13:15 – 14:15	**Assessment for 21st Century Skills** (Lecture will be given in English) Chair: Prof. **Michal Beller**, Director General, RAMA, Ministry of Education Prof. **Andreas Schleicher**, Educational Policy Advisor to the OECD Secretary-General
14:15 – 14:45	Coffee Break
14:45 – 17:15	**Learning and Teaching in Digital Environments: An Academic View** Chair: Prof. **Sheizaf Rafaeli** Director, Sagy Center for Internet Research; Director, School of Management, University of Haifa With the participation of: Prof. **Anat Zohar**, School of Education, Hebrew University of Jerusalem and the Mandel Leadership Institute Prof. **Lev Gonick**, Vice-President for Information Technology Services and Chief Information Officer, Case Western Reserve University Prof. **Marshall (Mike) S. Smith**, Visiting Professor, Harvard Graduate School of Education; former Under Secretary, U.S. Dept. of Education Prof. Gonick's and Prof. Smith's lectures will be given in English, via video conference
17:15 – 17:45	Concluding remarks: Dr. **Samuel Sattath,** Study committee member and coordinator of the symposium
17:45 – 18:00	Closing remarks: Dr. **Shimshon Shoshani**, Director General, Ministry of Education

Biographies of Members of the Research Steering Committee: A Proposal to Revamp Schooling for the 21st Century

Menahem Yaari, President (Emeritus), the Israel Academy of Sciences and Humanities, and Professor (Emeritus) of economics, Hebrew University of Jerusalem. Prof. Yaari is a member of the American Academy of Arts and Sciences, the American Philosophical Association, and the Berlin-Brandenburg Academy of Sciences. He is a recipient of the Israel Prize in Economics (1987) and the Rothschild Prize in the Social Sciences (1994).

Hagit Benbaji, Ph.D. in the Department of Philosophy at Ben-Gurion University of the Negev. Her research interests include fundamental issues in metaphysics and the philosophy of the mind with particular focus on the tension between our commonsensical view of the world and the scientific image. Dr. Benbaji holds a Ph.D. in philosophy, received from the Hebrew University of Jerusalem in 2002.

Nachman Ben-Yehuda, professor in the Department of Sociology and Anthropology at the Hebrew University of Jerusalem. In the past, he has served as department head and dean of the university's Faculty of Social Sciences. He has held visiting professor posts at the University of Toronto, Stony Brook University (N.Y.) and at the London School of Economics. His main areas of research are media and deviance, social control, religion and state, discourse analysis and social structure, collective memory and myth, science fiction and the structure of reality in combat films. Prof. Ben-Yehuda holds a Ph.D. in sociology, received from the University of Chicago in 1977.

Yaara Bar-On, deputy president for academic affairs at the Bezalel Academy of Arts and Design in Jerusalem. An associate professor at Bezalel, she teaches cultural and social history in the History Department, and research methodology and academic writing in the M.A. program in industrial design. Formerly, she was a lecturer at Tel Aviv University and also served as head of the Kremnitzer-Shenhar Report Implementation Committee of the Ministry of Education. She has published reference works in the historical documentary genre; her research focuses on women's lives, feminist theory and social thought. Dr. Bar-On is a 1999 graduate of the Mandel School for Educational Leadership. She received her Ph.D. in history from Tel Aviv University in 1997.

Yehuda Brandes has headed Beit Morasha, the Center for Advanced Judaic Studies and Leadership in Jerusalem, since 1998, and serves as the academic director for the Center's Robert M. Beren College. He is also a lecturer at the Herzog College in Alon Shvut. From 1992 to 1997, he was the principal of Himmelfarb High School in Jerusalem. He was among the founders of the Ma'aleh School of Television, Film and the Arts. He serves on the AMIT network's spiritual-pedagogical committee, and is a member of the national plenum of the Bnei Akiva youth movement. His books and articles discuss topics in Talmud, Jewish halacha (law) and aggadah (legend), and Jewish thought and education. Rabbi Dr. Brandes is a graduate of Yeshivat HaKotel and received rabbinic ordination from the Israel Chief

Rabbinate. He holds a Ph.D. in Talmud, received from the Hebrew University of Jerusalem in 2003.

Shaul Hochstein, professor of neurobiology at the Institute of Life Sciences and the Interdisciplinary Center for Neural Computation at the Hebrew University of Jerusalem. His research focuses on different levels of the visual system, from transduction of absorbed light in the eye, through processing of visual information by the eye and brain, to construction of representations of the visual scene in the hierarchy of areas of the cortex, storing these representations in memory, and learning and acquisition of perceptional skills. He holds a Ph.D. in zoology from the Hebrew University of Jerusalem, 1972.

Adam Lefstein, senior lecturer in the Department of Education at Ben-Gurion University of the Negev. Formerly, he was a lecturer in the Institute of Education at the University of London; he also directed the Community of Thinking program at the Branco Weiss Institute in Jerusalem. His research focuses on the intersections of policy, pedagogy and classroom interaction. He is currently leading research on processes of continuity and change in patterns of interaction in the classroom, dialogic teaching and the use of video for teachers' professional development. Dr. Lefstein holds a Ph.D. in education from King's College London, received in 2005.

Fadia Nasser-Abu Alhija, Associate professor at the School of Education of Tel Aviv University. From 2007 to 2011, she headed the Department of Curriculum Planning and Instruction and the Program for Research, Measurement and Evaluation Methods. Previously, she was research coordinator for GRE testing at the Educational Testing Service (ETS) in Princeton, N.J. (U.S.). Her main research topics are measurement and evaluation of gender- and culture-related achievements; evaluation of teachers and teaching; and, the construct validity of test scores. Prof. Nasser-Abu Alhija earned her Ph.D. in Research, Evaluation, Measurement and Statistical Methods from the University of Georgia (U.S.) in 1997.

Samuel Sattath, visiting researcher in the field of evolution at the Hebrew University of Jerusalem's Faculty of Life Sciences. His research has dealt with topics in decision-making as well as building measurement models and tools (in the psychological context). He is active in the business sector, founding and managing software initiatives (including serving on boards of directors of private and public companies in Israel and abroad). He is among the founders of Pilat, where he led the area of assessment systems which incorporate the aspects of the establishment, methodology and implementation of organizational change in large corporations. Dr. Sattath holds an M.A. in mathematics and a Ph.D. in the field of cognition from the Department of Psychology at the Hebrew University of Jerusalem, received in 1988.

Ofra Brandes, Mrs. Brandes is a member of the National Center for Computer Science Teachers steering committee. She teaches education and computer sciences at the Tal College and at the Michlalah-Jerusalem College. She headed the computer sciences team

for 16 years at the Hebrew University of Jerusalem's Science Teaching Center, was involved in developing curricula and study materials for the secondary school matriculation exams, and directed and taught in-service teacher education programs. Mrs. Brandes holds a B.S. in statistics and computer sciences from Bar Ilan University, and in 2002 received an M.A. in science education (specializing in computer sciences) from the Hebrew University of Jerusalem, where she is currently studying for her Ph.D. in science education.

Brief Biographies for the "Pedagogy in the Information Age" Symposium

The participants and the organizations they represent are listed in alphabetical order.

Sarit Barzilai, Pedagogic Director of the "Snunit" Center for the Advancement of Web-based Learning, established by the Hebrew University of Jerusalem. Ms. Barzilai is responsible for creating Snunit's pedagogic vision and formulating its pedagogic-technology strategy. She led the development of numerous innovative interactive environments including the "Galim" ("Waves") learning environment for primary schools, "Al HaGova" – the Israeli government's site for children, the "Galim Community" – a social-learning network, and more. She researches the effects of information technologies on thinking and learning processes, the relation between personal beliefs and ideas about knowledge and knowing and web-based learning, and the integration of computer games in learning and teaching.
Ms. Barzilai holds an M.A. in cognition, instruction and computers from the Hebrew University of Jerusalem's School of Education, received in 2003. She is completing her Ph.D. in education at the Hebrew University.

Michal Beller, Founder and Director General of the Israeli National Authority for Measurement and Evaluation in Education (RAMA). Her area of expertise is educational measurement and evaluation. Prior to her present position, she was Senior Research Director of R&D at the Educational Testing Service (ETS) in Princeton, NJ, the largest testing institute in the world. Before joining ETS, she served as Director of the National Institute for Testing and Evaluation (established by Israeli universities) and was an associate professor in the Department of Education and Psychology at the Open University where she founded and directed the Center for Technology Integration for Distance Teaching. Prof. Beller holds a Ph.D. in psychology from the Hebrew University, received in 1982.

Gila Ben Har, Chief Executive Director of the Center for Educational Technology (CET) for the past eight years. Prior to joining CET, she headed the city of Tel Aviv-Jaffa's Education, Culture and Sports Administration, where during her four-year tenure, she directed the municipality's educational policy planning and implementation. She is an alumna of the Mandel Leadership Institute's first group of scholars. During her studies there, she researched decentralization and centralization trends in the education system, and the place of the education system in local government. Her academic studies focused on curricula, educational administration, and technology in education.
Ms. Ben Har received her B.A. and M.A. degrees from Bar-Ilan University.

Lev Gonick, Vice-President for Information Technology Services and Chief Information Officer at Case Western Reserve University. He co-chairs Cisco Systems Higher Education Executive Exchange and is a member of many American and international committees involved in education, the arts and technology. Prof. Gonick founded the community ultrabroadband provider, OneCommunity, which works to provide the opportunity and means for utilizing information technology in the fields of education, health and government.

This program, as well as others which he conceived, have earned him the reputation of a leading figure in the world of community-education interactive computing. He began his activities in the field in 1985 when he supported the establishment of the first interactive networks in South Africa, facilitating connectivity between health-care professionals and nongovernmental organizations in the field. Prof. Gonick is involved in the planning and implementation of a digital learning network project in the United States and in many countries around the world.
Prof. Gonick holds a Ph.D. in international political economy from York University (Ontario).

Sharon Greenberg, Head of Internet Technologies at the ORT Israel network of schools where he is involved in developing and implementing new technologies for ORT Israel and the education system, as a whole. Among other things, he is responsible for introducing content management systems and learning management systems such as "MOODLE." He also runs an ORT joint venture with Google designed to train teachers to use Google tools, and trains school principals in the program to adapt the education system to the 21st century. Greenberg is on the staff of the Dept. of Information Science at Bar-Ilan University, teaching a variety of courses that deal with social media and open source content management systems. He has been active in the educational web for 15 years.
Mr. Greenberg holds a Bachelor's degree from the Bezalel Academy of Arts and Design and a Master's degree from Bar-Ilan University.

Eli Hurvitz, Executive Director of the Trump Foundation, a new philanthropic foundation in Israel, which aims to serve as a catalyst for improving educational achievement in Israel by cultivating high-quality teaching in schools. Mr. Hurvitz was among the founders of the "Avney Rosha" Institute for school leadership and is today on the Center for Scientific Education's board of directors. From 2000 to 2011, he served as the deputy director of Yad Hanadiv (the Rothschild Foundation) and prior to that served as the assistant to the chairman of the Knesset's Foreign and Defense Committee and as coordinator of one of its subcommittees. As an officer in the IDF, he also held a number of positions in the Central Collection Unit of the Intelligence Branch.
Mr. Hurvitz holds an M.A. in Middle-Eastern history from Tel Aviv University, received in 1996.

Irwin M. Jacobs, Chairman of the (U.S.) National Academy of Engineering; founding Chairman and CEO of Qualcomm whose focus is on advanced wireless technology; he currently serves on its board of directors. In 1968, he was founding Chairman and CEO of Linkabit which dealt with the design and manufacture of satellite terminals. From 1959 to 1966, he was a professor of Electrical Engineering at the Massachusetts Institute of Technology and from 1966 to 1972, he was a professor of engineering and computer sciences at the University of California. Since 2006, Dr. Jacobs has been serving as chairman of the Salk Institute's Board of Trustees. Dr. Jacobs is the recipient of numerous awards and prizes honoring, in the main, his contributions in the fields of industry, education and business. Dr. Jacobs has received seven honorary doctorates, two of them from Israeli institutions – from the Technion in 2000 and from Tel Aviv University in 2010.

Sheizaf Rafaeli, Researcher and lecturer in the field of Internet culture and computer-mediated communication. Prof. Rafaeli directs the Sagy Center for Internet Research and leads the Games for Executives project at the University of Haifa. He has been the director of the university's School of Management since 2006. In the past, he has taught at several universities in the United States, Australia and at the Hebrew University of Jerusalem. His research focuses on questions of interactivity, researching networks, the value of information, information sharing and information dumping, multiple tasks, individual and organizational use of information systems, and Internet culture. He has been involved with questions of ethics of computers and networks and in building online learning systems and computer games.
Prof. Rafaeli holds a Ph.D. from Stanford University, received in 1985.

Ofer Rimon, Director of the Ministry of Education's Science and Technology Administration; served as the director of the Development and Evaluation Unit at the Rashi Foundation. From 2000 to 2006, he held a number of positions at the Ministry of Education in which he handled a variety of educational issues – fostering literacy in the sciences, mathematics and reading, planning and administration of the program for cooperative learning via the Internet between Israel and other countries, development of quantitative thinking, etc. In the past, he was a teacher and head teacher in primary school, high school and college.
Dr. Rimon holds a Ph.D. in science education from the Hebrew University of Jerusalem, received in 2006.

Samuel Sattath, Visiting Researcher in the field of evolution at the Hebrew University of Jerusalem's Faculty of Life Sciences. His research has dealt with topics in decision-making as well as building measurement models and tools (in the psychological context). He is active in the business sector, founding and managing software initiatives (including serving on boards of directors of private and public companies in Israel and abroad). He is among the founders of Pilat, where he led the area of assessment systems that incorporate the aspects of the establishment, methodology and implementation of organizational change in large corporations.
Dr. Sattath holds an M.A. in mathematics and a Ph.D. in the field of cognition from the Department of Psychology at the Hebrew University of Jerusalem, received in 1988.

Andreas Schleicher is Special Advisor on Education Policy to OECD's Secretary-General. As Head of OECD's programs on indicators and analysis in the Directorate for Education, he is also responsible for the development and analysis of benchmarks on the performance of education systems and on the impact of knowledge and skills on economic and social outcomes, including the Programme for International Student Assessment (PISA), the Programme for the International Assessment of Adult Competencies (PIAAC), the Programme for Measurement on Teachers, Teaching and Learning and the Education Indicators Programme (INES). Before joining the OECD in 1994, he was Director for Analysis at the International Association for Educational Achievement (IEA). He studied physics in Germany and received a degree in mathematics and statistics in Australia. He is the recipient of numerous honors and awards, including the "Theodor Heuss" prize, awarded in

the name of the first president of the Federal Republic of Germany for "exemplary democratic engagement." He holds an honorary Professorship at the University of Heidelberg.

Dan Shechtman, Nobel Laureate in Chemistry, 2011, is a professor of Materials Engineering at the Technion and a member of the Israel Academy of Sciences and Humanities. Professor Shechtman chaired the Steering Committee of the Initiative for Applied Education Research for five years, since its establishment.
Professor Shechtman's research focuses on material structure. His unique discovery of quasicrystals revolutionized the laws of crystallography and won him the 2011 Nobel Prize in Chemistry. His academic degrees, in the fields of Mechanical Engineering and Material Engineering were earned at the Technion. After receiving his PhD, Professor Shechtman was an NRC fellow at the aerospace Research Laboratories at Wright Patterson AFB, Ohio, where he studied the microstructure and physical metallurgy of titanium aluminides for three years. In 1975 he joined the department of Materials Engineering at the Technion, and served over the years as Visiting Professor in various universities and research institutes in the US.
Professor Shechtman is a member of the European Academy of Sciences. He was awarded many prizes and honors, among them the Rothschild Prize in Engineering, the Israel Prize in Physics, the Wolf Prize in Physics, the Gregori Aminoff Prize of the Royal Swedish Academy of Sciences and the EMET Prize in Chemistry.

Shimshon Shoshani, Serving his third term as Managing Director of the Ministry of Education. Dr. Shoshani started his career as a school teacher and principal and has, over the years, directed various divisions and branches at the Ministry. He has also served in various education posts for the city of Tel Aviv and co-founded Jerusalem's Education Administration. In the area of communication with the international Jewish world, Dr. Shoshani served as the Jewish Agency's executive director, managing director of the Taglit project and was the director of the ORT network in Latin America. He headed the "Shoshani Commission" which examined the various methods of budget allocation in the primary school system in Israel and alternate methods of support (2002). At the same time, he has also held a series of public roles. He served as an adjunct lecturer in the Schools of Education at the University of Haifa, Tel Aviv University and the Hebrew University of Jerusalem. He is a recipient of the Chaim Herzog Prize awarded by the Hebrew University in cooperation with Yad Chaim Herzog for his contribution to the State of Israel (2009).
Dr. Shoshani holds a Ph.D. in education administration from New York University, received in 1975.

Marshall (Mike) S. Smith, Member of the (U.S.) National Academy of Education; During the tenure of three U.S. presidents – Carter, Clinton and Obama – he served in posts related to education (During the Clinton administration, Smith was the Acting Deputy Secretary and Under Secretary for Education for seven years; he recently retired from his role in the Obama Administration as senior advisor to the U.S. Secretary of Education and the Office's director of international communications). Smith is considered one of the ten leading figures in the field of educational policy in the U.S. He has been actively involved in formulating major laws in

the field of education and in their ratification. Over the years, Prof. Smith has held a series of central academic positions and served as dean of Stanford University's School of Education. Prof. Smith has a Ed.D. in measurement and statistics from the School of Education at Harvard University, where he now is a Visiting Professor.

Dovi Weiss, Pedagogic Founder of "Time to Know" and the company's Chief Scientist. Weiss has more than 15 years experience in developing computer-integrated learning environments and in mathematics education. As part of his studies in business administration, he specialized in inventive thinking. Mr. Weiss in an alumnus of the Mandel Leadership Institute's 11th group of scholars and in 2010, the (Israeli) Ha'aretz daily newspaper named him as one of 50 people impacting education in Israel.
Mr. Weiss hold an M.A. in educational technology from Boston University, received in 1991, and an M.B.A. from Tel Aviv University, received in 1996. He is currently completing his Ph.D. in mathematics and science education from Tel Aviv University.

Menahem Yaari, Chairperson of the study committee addressing the topic of a "Proposal to Revamp Schooling for the 21st Century," organizers of the present symposium; Chairperson of the Initiative for Applied Education Research's steering committee, and President (Emeritus) of the Israel Academy of Sciences and Humanities. He is a Professor (Emeritus) of economics at the Hebrew University of Jerusalem, a member of the American Academy of Arts and Sciences, the American Philosophical Society and the Berlin-Brandenburg Academy of Sciences and Humanities.
Prof. Yaari is an Israel Prize recipient (1987) in the area of economics and in 1994, was a Rothschild Prize recipient.

Anat Zohar, Faculty member at the School of Education, Hebrew University of Jerusalem and at the Mandel Leadership Institute. Her main areas of research interest are the development of higher order thinking for children and teachers, metacognition, inquiry learning, science education, and aspects of gender, thinking and learning. She also studies the gap between educational policies in the area of learning and instruction and their classroom implementation, and the challenges involved in scaling-up educational projects in the field of learning and instruction. Between 2006-2009, she served as Director of Pedagogical Affairs in the Ministry of Education. In this capacity she led the "Pedagogic Horizons – Education for Thinking" program, promoting the development of thinking and literacy across the curriculum.
Dr. Zohar holds a Ph.D. from the Department of Science Education at the Hebrew University of Jerusalem, received in 1991.

CET, the Center for Educational Technology, is a non-profit organization which, during the past four decades, has been working to promote education in Israel. It is the leading player in development and deployment of both printed and digital content, tools and environments for teaching, learning and assessment. CET's vision is to advance education in Israel and to provide every student with the opportunity to study in an advanced learning environment that combines pedagogy and up-to-date technology filled with high-quality content – a

learning environment that will place students at the forefront of knowledge and prepare them to be 21st century citizens who contribute in terms productivity, values and society.
During the past year, CET launched its digital "eBag," which provides a comprehensive solution, across all subjects, for students in all age groups and from all population sectors – both Hebrew and Arabic speakers, from large cities and communities in the periphery, and students with special needs. The key elements of the eBag system are digital textbooks (Koter Textbooks), interactive activities for teaching, learning and assessment (the Ofek system for elementary and for secondary schools), and a school portal.

Et HaDa'at (Time to Know) – In Israel and worldwide, the Time to Know program offers the first holistic, systemic solution that integrates pedagogy with technology in the classroom and successfully addresses the challenges of teaching and learning placed upon the school and the teacher in the 21st century. The solution combines an innovative digital teaching platform with interactive content suited to schools' core curriculum. Participating in the program's development over a five-year period were 300 experts in pedagogy, technology and multimedia. The Time to Know system can be utilized free of charge in Israel; during the past four years, the program has been successfully implemented around the country. An evaluation study, conducted by the Szold Institute, found that Time to Know improves students' achievement and raises their motivation. In the 2011-2012 school year, the program is expected to be in operation in approximately 100 schools in 20 separate regional authorities in Israel. In addition, the program is used by about 30 schools in the United States and Singapore. In 2009, the President's Conference selected Time to Know as one of the six Israeli initiatives capable of contributing to a better future.

Founded in 1949, **ORT Israel** is the leading education network in Israel, and the largest, promoting high-quality and innovative education focusing on technology and the sciences, instilling values and aspiring toward excellence. The network, which runs roughly 190 six-year secondary school institutions as well as academic colleges for adults and young people, numbers 7,900 employees and approximately 100,000 students comprising about 10% of all secondary school students in Israel. The ORT network is active throughout the length and breadth of Israel – from Hazor, Ma'alot and Shlomi in the North and to Yerucham in the South. The network represents a human mosaic of all the various communities living in Israel: Jews (secular and religious), Druze and Arabs, those living in the major cities as well as in the periphery.
The ORT network is a non-profit educational organization which annually invests between 15-30 million NIS, raised from contributions in Israel and around the world, in the State of Israel's education system of secondary schools. The source of the donations is from individuals, associations, foundations and corporations in Israel, the United States, Canada and Europe.
The educational creed by which ORT Israel operates is to strive for academic excellence and to contribute to one's fellow-man and to the community. ORT believes that only through the combination of creating personal responsibility to society on the one hand, and focusing on technological and scientific education on the other, can the State of Israel's social and economic resilience be promoted.

Snunit Center for the Advancement of Web-based Learning is an entrepreneurial, innovative and leading organization in the field of ICT education which realizes technology's added value for promoting learning, teaching and assessment processes. Snunit, a non-profit organization established by the Hebrew University, has been operating for the past 16 years in Jerusalem. The developments in which Snunit specializes – interactive educational content products and advanced content solutions for the education system and for informal learning – are designed for children, teachers, parents and the public at large. Snunit is active throughout Israel, from the south to the north and serves approximately 900 schools, 250,000 children, 21,000 households and 500 public libraries.