

Educating for a Society of Culture and Knowledge:

21st Century Changes and their Educational Implications

Executive Summary

Editors:

Ofra Brandes and Emanuel Strauss



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

Executive Summary
(Translated from Hebrew Original)

Educating for a Society of Culture and Knowledge:

**21st Century
Changes and their
Educational Implications**

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Ofra Brandes | Emanuel Strauss

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

Language editor (Hebrew original): Ada Paldor

English translator: Judyth Eichenholz

Graphic design: Scorpio 88

Cover design: Studio Shimon Schneider

Graphic design of the pre-publication version: Esti Boehm

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Brandes, O. & Strauss, E. (Editors). Educating for a Society of Culture and Knowledge: Changes in the 21st Century and their Implications. The Israel Academy of Sciences and Humanities. Jerusalem: 2013.

ISBN: 978-965-208-198-8

The Israel Academy of Sciences and Humanities was founded in 1959. Its membership currently comprises close to 100 top Israeli scientists and scholars. The Israel Academy of Sciences and Humanities Law, 1961, declares that its 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. This kind of information is crucial for the intelligent formulation of policy and for optimal planning of interventions to improve educational achievements in Israel.

The Initiative's vision: Research knowledge is an essential component for planning public policy or comprehensive interventions. In the planning phase, critically-appraised research knowledge supports the formulation of policy whose chance of success is greater, and at a later point, enables rational public discourse to take place. The Initiative implements this vision in the field of education.

The Initiative's method of operation: The issues the Initiative addresses are those raised by decision-makers and it 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 work program and the peer-review processes of 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 the Rothschild Foundation (Yad Hanadiv). 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 Israel Academy's advisory role vis-a-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.

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

The committee was established to study options for reorganizing the education system in Israel so that it adapts to meet the needs of the 21st century. The committee's activities were conducted under the auspices of the Israel Academy of Science's Initiative for Applied Education Research.

The report presents a picture of the changes that have taken place in Israeli society in recent decades, examines their implications for education system goals and makes the derived recommendations.

In 2011, in response to a request made by Dr. Shimshon Shoshani, the outgoing director-general of the Ministry of Education, an expert committee was created to study options for reorganizing the education system in Israel in order to adapt it to the needs of the 21st century. In her meeting with the expert committee in 2012, the new director-general, Ms. Dalit Stauber, confirmed the need for examining these educational challenges in light of current and anticipated changes in Israeli society.

The committee undertook to review research-based knowledge in the field, collected in Israel and abroad, and to submit recommendations. The committee was headed by Prof. (Emeritus) Menahem Yaari of the Hebrew University of Jerusalem and President (Emeritus) of the Israel Academy of Sciences and Humanities, and conducted its activities through the Israel Academy's Initiative for Applied Education Research. It began its work in Fall, 2011. The committee investigated the topic through meetings, discussions, fact-finding tours and a symposium; they heard testimony from various experts, commissioned scientific literature and current status reviews, and collected and analyzed additional empirical information.

At the close of its deliberations, the committee prepared this consensual report which presents a picture of the changes that have taken place in Israeli society during the latter part of the previous century through to the present. The document examines the implications of these changes for education system objectives and organization and presents the committee's recommendations that relate to these changes and their implications. In all these areas, the committee has relied upon the accumulated empirical research knowledge with reference to both the changes that have taken place and the possible and appropriate areas to be addressed.

Following peer review, this document was presented to senior Ministry of Education officials; it is available to the public on the Initiative's [website](#).

Committee members:

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

*Prof. Yaara Bar-On, Bezalel Academy of Arts and Design, Jerusalem;
Oranim College*

Prof. Nachman Ben-Yehuda, Hebrew University of Jerusalem (committee member until Summer 2012)

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 coordinators:

Ofra Brandes, committee coordinator from 2011 until December 2012

Dr. Emanuel Strauss, committee coordinator from January 2013

Acknowledgements

During the years of its activity, the expert committee was assisted by many experts from both the fields of research and practice. With its work completed and the document published, the committee would like to thank everyone who contributed of their time, expertise and good will.¹ We apologize in advance if we have inadvertently omitted any one from among those who helped and supported our endeavors.

First and foremost, we would like to thank Dr. Shimshon Shoshani, former director-general of the Ministry of Education, who initiated the establishment of the committee: Mr. Moshe Decalo, senior division director, School Organization, Pedagogical Administration; Ms. Dalia Fenig, chair, Inspectors Division and acting chair, Pedagogical Secretariat; Ms. Yaffa Pass, director, division of high school education; Dr. Hanna Perl, inspector for mathematics; Ms. Miriam Recanati, assistant to the director-general and, Ms. Lea Rozenberg, deputy director and head of the Pedagogical Administration.

We express our heartfelt thanks to Ms. Dalia Fenig, deputy chair of the Pedagogical Secretariat, who was the committee's primary contact person within the Ministry of Education corridors, who attended and guided the committee and helped make the initial connections within the system. Ms. Fenig continued to closely follow our activities until their completion and we thank her for this.

Our special appreciation goes to the director-general, Ms. Dalit Stauber, and to Prof. Ofra Mayseless, chair of the Pedagogical Secretariat who, as soon as they assumed their new positions and despite the weight of their many duties, were in contact with the committee, met with its members and created continuity in our joint work.

Many thanks to all the experts who contributed their efforts and their time, participated in the various committee meetings and helped provide the committee members with first-hand knowledge of practice and research. The information and data presented to the committee were put to valuable use in its discussions. Our thanks to: Dr. Arie Barnea, principal of the Beer Tuvia high school; Prof. David K. Cohen of the University of Michigan; Mr. Shlomo Dovrat, past chair of the Dovrat Commission for Education Reform in Israel and currently co-founder and general partner in Carmel Ventures, a venture capital firm; Dr. Yoram Harpaz, lecturer in Beit Berl and Al-Qasemi colleges and end editor of the "Hed HaHinuch" ("Educational Echo") newspaper; Dr. Aharon Hauptman of Tel Aviv University's

¹ The names that follow are presented in alphabetical order of the surname. The position held or affiliation listed is valid for the period during which the committee operated.

Interdisciplinary Center for Technological Analysis and Forecasting; Prof. Mordecai Nisan of the Hebrew University's School of Education and the Mandel Foundation; Dr. Tal Soffer of Tel Aviv University's Interdisciplinary Center for Technological Analysis and Forecasting; and, Prof. Anat Zohar of the Hebrew University's School of Education and the Mandel Leadership Institute.

Thanks to Dr. Anat Gofen of the Hebrew University of Jerusalem who placed information from her innovative research at our disposal and to Prof. Michael J. Feuer of George Washington University for his wise and valuable counsel throughout this committee's work.

Thank you to all the Ministry of Education personnel who met with the committee and presented an instructive picture of their worthy and extensive work: Dr. Yael Bernholz; Dr. Adar Cohen, inspector for civics studies at the Ministry of Education; Mr. Erez Eshel and his assistant, Mr. Shimon Shimon; Dr. Shlomit Ginossar; Ms. Ruth Knoller; Ms. Belly Maram; Ms. Mira Mor; Ms. Talia Neeman; Ms. Chava Peleg; Ms. Ada Rosenberg; Ms. Esti Roset; Ms. Hanna Schwartz; Ms. Hanna Shadmi; Ms. Ronit Sharvit; Dr. Zvi Zameret, chair of the Pedagogical Secretariat.

To carry out its work, the committee commissioned scientific literature reviews on various topics. The committee thanks all the reviewers and their assistants who faithfully carried out their work and made every effort to gather all the research findings available in Israel and abroad on their respective topics. The committee made use of this material in its discussions. Thanks to Ms. Maya Zuckerman; Dr. Yehoshua Mathias and Mr. Guy Aloni of the Hebrew University of Jerusalem; Dr. David Fortus of the Weizmann Institute of Science; Dr. Sara Klein of Orot Israel College, and Dr. Ariel Sarid of Ben-Gurion University of the Negev.

For help freely given, the committee also wishes to thank Prof. Dan Avnon, former head of the Gilo Center for Citizenship, Democracy and Civic Education at the Hebrew University of Jerusalem; Mr. Aviv Cohen of Columbia University; Dr. Mordechai Chaziza of the Ashkelon Academic College; Prof. Yaakov Katz, former chair of the Ministry of Education's Pedagogical Secretariat; Dr. Hadar Lifshitz of Ashkelon Academic College, and Dr. Michal Neubauer-Shani of Ashkelon Academic College. Thank you all.

In October 2011, the committee held a symposium on "Pedagogy in the Information Age." It gathered together researchers and practitioners from different sectors for whom this topic is at the core of their research and practice, and they shared their experience with the symposium attendees. The information that was gathered on that day and during the preceding period, through meetings of committee representatives with a range of workers in the field, practitioners and researchers – were collected in a

data base created by the committee which they used for their work. Our thanks to everyone who met with us during the preparatory period ahead of the symposium and presented their activities: Mr. Dror Aloni of the Kfar Shmaryahu local council who also wrote a position paper for the committee on the topic of values; Mr. Ido Argaman of the Mevoot Hanegev school and representative of the Kibbutz Shoval students; Dr. Ronit Ashkenazi of the AMAL Network; Mr. Ofer Brandes of the venture capital fund, Carmel Ventures; Dr. Eli Eisenberg of the ORT Israel education Network; Dr. Yossi Elran of the Davidson Institute for Scientific Education at the Weizmann Institute of Science; Gen. (Ret.) Eli Fishoff, former head of the IDF's Behavioral Sciences Division and CEO of Pilat; Dr. Avi Golan of the Davidson Institute for Scientific Education at the Weizmann Institute of Science; Prof. Haim Harari of the Davidson Institute for Scientific Education at the Weizmann Institute of Science; Mr. Eli Homburg of the Snunit Center for the Advancement of Web-based Learning; Dr. Ariel Heimann of the Davidson Institute for Scientific Education at the Weizmann Institute of Science; Dr. Sara Hershkovitz of CET – the Center for Educational Technology; Mr. Eli Kanai of the Avi Chai Foundation; Dr. Miri Kesner of CET – the Center for Educational Technology; Mr. Guy Levi of CET – the Center for Educational Technology; Ms. Dafna Lifshitz of the Tapuah association; Prof. David Mioduser of Tel Aviv University; Dr. Rachel Mintz of CET – the Center for Educational Technology; Ms. Sofia Mintz of the Ministry of Education; Prof. Rafi Nachmias of Tel Aviv University; Ms. Revital Rubin of the Snunit Center for the Advancement of Web-based Learning; Ms. Yonit Sadan of the Snunit Center for the Advancement of Web-based Learning; Mr. Eli Warshavsky of CET – the Center for Educational Technology; Ms. Michal Jacobi of CET – the Center for Educational Technology; Prof. Michal Yerushalmy of the University of Haifa, and Prof. Anat Zohar of Hebrew University's School of Education and the Mandel Leadership Institute. We, the committee members, wish to thank all the schools, principals and teachers and everyone else who helped us gain an impression and become acquainted with practice, as it takes place in the field. A special thank you to the principals of the schools in Ganei Tikva who made every effort to assist us: Ms. Aviva Balaish, Ms. Galit Bar El and Ms. Carmela Bechar.

A big thank you to the many symposium speakers who captivated the audience with their words: Ms. Sarit Barzilai of the Snunit Center for the Advancement of Web-based Learning; Prof. Michal Beller of RAMA (Israeli National Authority for Measurement and Evaluation in Education); Ms. Gila Ben Har of the Center for Educational Technology; Prof. Lev Gonick of Case Western Reserve University; Mr. Sharon Greenberg of the ORT Israel Network; Mr. Eli Hurvitz of the Trump Foundation; Dr. Irwin M. Jacobs of the National Academy of Engineering (U.S.); Prof. Shezaf Rafaeli of the Sagy Center for Internet Research at the University of Haifa; Dr. Ofer Rimon

of the Ministry of Education; Prof. Dan Schechtman of the Technion, Haifa; Prof. Andreas Schleicher of the OECD; Prof. Marshall (Mike) S. Smith of the National Academy of Education (U.S.); Dr. Dovi Weiss of the "Time to Know" program; and, Prof. Anat Zohar from the School of Education at the Hebrew University of Jerusalem and the Mandel Leadership Institute.

The document containing summaries from the symposium is available on the Initiative website in the "Publications" section; the presentations and filmed lectures can be found in the "Events" section.

In addressing the topic of value-based education, the committee sought to form an impression, from diverse perspectives of Israeli public opinion, of the prevailing mood in Israeli society on this central and sensitive topic. In the winter of 2012, the committee issued a call to the public to submit position papers relating to questions concerning the place of values in the education system. The response exceeded expectations. A collection containing a portion of the position papers as well as an academic mapping and discussion of their findings will be published by the Initiative for Applied Education Research and made available to the public on the Initiative's website.² Due to various editorial considerations, it was not possible to include all the material received by the committee in the mapping and the publication; we would, however, like to thank all those who wrote: Dr. Yosef Abinun of the Kibbutzim College of Education; Prof. Khawla Abu-Baker of the Jezreel Valley College; Prof. Dan Avnon for the Hebrew University of Jerusalem; academic staff from schools of education who submitted a joint position paper: Prof. Chaim (emeritus) Adler, Prof. Dorit Aram, Prof. Daniel Bar-Tal, Prof. Avner Ben-Amos, Dr. Rachel Erhard, Prof. Dan Inbar, Dr. Edna Inbar, Prof. Iris Levin, Dr. Tova Most, Dr. Julia Resnik, Dr. Nura Resh, Prof. Shifra Sagy, Prof. Gabi Salomon, Prof. Gali Cinamon, Prof. Ami Volensky; We also thank Prof. Nimrod Aloni of Kibbutzim College of Education; Dr. Arie Barnea of the Beer Tuvia regional high school; Prof. Shlomo Back of Kay College and the MOFET Institute; Mr. Shlomi Ben Aftar of the Ziv and Marks High School in Jerusalem; Rabbi Dr. Aharon Buzaglo who wrote his position paper based on his work at Bar-Ilan University; Dr. Eti Chagai, expert on personal and organizational development; Dr. Aliza Corb, Ms. Liora Pascal, Efrat Shapira Rosenberg and Dr. Eli Silver of the Avi-Chai Foundation; Prof. Samuel Dagan of Tel Aviv University; Ms. Einat Dahari of the Interdisciplinary Center Herzliya; Mr. Dekel-David Ozer, social initiatives activist; Dr. Mor Deshen and Ms. Edna Tiktin of the AMIT Network; Ms. Esther Eilam of the Coalition Against Racism in Israel; Mr. Amir Freimann of the Education Spirit Movement; Mr. Danny Gal, lecturer

² Brandes, O. & Issachar, R. (Eds). *Value-based Education in a Changing World – Collection of Position Papers* commissioned by the committee studying a Proposal to Revamp Schooling for the 21st Century, The Initiative for Applied Education Research, Jerusalem, 2013. (Hebrew)

and consultant on organizational learning processes; Ms. Gila Galter and Ms. Miri Tzadok-Goldratt of Theory of Constraints for Education - Israel; Mr. Gilad Goldschmidt of the Kibbutzim College of Education; Mr. Avinoam Granot, head of the Educational Administration in the Holon municipality; Prof. Dan Inbar of the Hebrew University of Jerusalem; The Israel Institute for Empowering Ingenuity; Dr. Avraham Lifshitz, head of the Religious Education Administration; Prof. Ron Margolin of Tel Aviv University; Ms. Ronit Miller of Sapir Academic College; Prof. Nitsa Movshovitz-Hadar of the Technion in Haifa; Ms. Einat Peled of the Technion in Haifa; Dr. Gil Pereg, executive director of the Darca Schools network founded by the Rashi Foundation; Mr. Roey Perlstein-Dvir and Ms. Einat Rom of the Lifta Experimental High School in Jerusalem; Dr. Lotem Perry-Hazan of the University of Haifa; Dr. Avi Poleg of the Center for Excellence through Education and Moish Berdichev, director of "Excellence 2000"; Ms. Esther Shapira; Dr. Nili Shirion, lecturer on psychology and Judaism topics in the private sector; stakeholders from schools of education who, together, submitted a joint position paper – Dr. Avraham Frank, Prof. Yaakov Malkin, Rabbi Sivan Mass and Mr. Oren Yehi-Shalom of the CIE - the Center for Israeli Education; Prof. Yeshayahu Tadmor of the Jezreel Valley College and Oranim College; Dr. Moshe Weinstock, director of the "Heart to Know" program at the Ministry of Education.

We, likewise, wish to thank Mr. Aharon Karish and Dr. Amnon Eldar of the AMIT Network who provided answers to questions in their initial version.

Special thanks to Mr. Uri Kandel and Ms. Neta Sovinsky who were involved in mapping the position papers and producing the collection.

The committee gratefully acknowledges the staff of the Israel Academy of Sciences and Humanities for their assistance in fulfilling our every request and for their responsiveness to the committee's needs throughout its work. We express our great appreciation to Yad Hanadiv for their devoted support of the committee's activities.

Many thanks to Ms. Daphna Auerbach who (voluntarily) assisted in preparing the diagrams accompanying this document.

Many thanks to past and present Initiative for Applied Education Research staff for their professional, friendly and warm support and assistance throughout: Thanks to Ms. Riki Fishel, Ms. Liat Netzer, Ms. Udit Nisan and Ms. Avia Shemesh. Special thanks to Ms. Ziva Dekel and Ms. Reut Issachar who, cheerfully and with unending patience, brought this complex operation to completion all within a positive, cooperative and productive atmosphere. Much thanks goes to Ms. Ada Paldor, the Initiative's dedicated language editor who, charged with editing this document's chapters, did so with wisdom and warmth, and to Ms. Nili Eden who intelligently and willingly assisted with occasional editing. A warm thank you to our

members-colleagues: Mr. Yehoshua Rosenberg, Mr. Itay Pollak, Dr. Naomi Mandel-Levy, Dr. Guy Ron-Gilboa, Dr. Sergey Talanker and Mr. Oded Busharian who created a friendly and supportive environment, and were always ready with advice and encouragement.

Special thanks to Dr. Avital Darmon, the director of the Initiative who, with determination and confidence steered the committee's activities and closely and carefully followed the committee's work up to the finish line, ending with publication of this report.

Sincere thanks to all.

Peer review

The draft of the committee's report summing up its work was sent to peers in Israel and abroad for review. Up to the time of this document's publication the identity of the reviewers remained unknown to the committee members. The peer review process is intended to ensure external professional, pertinent and impartial assessment that will help the authors of this report improve their work and transform it into a practical and useful document. We would like to thank the reviewers for reading the report and writing their critiques.

The draft of the committee's report summing up its work was sent to peers in Israel and abroad for review to ensure external professional, pertinent and impartial assessment.

The reviewers

Prof. (Emerita) Miriam Ben-Peretz, University of Haifa, recipient of the Israel Prize for education

Dr. Stuart Elliott, Director of the Board on Testing and Assessment, National Research Council (U.S.)

Ms. Kalya Hilu, Executive Director, CIM ORT, the Israeli School in Mexico

Prof. Yuli Tamir, President of Shenkar College of Engineering and Design, past Minister of Education

The above-mentioned reviewers provided constructive comments and suggested additions and corrections to the report draft they read. At the same time, the reviewers were not asked to adopt the conclusions and recommendations made by the expert committee and did not see the revised version of this document before it was printed. The expert committee takes full responsibility for the final content of this document.

We extend our sincere appreciation to all.

Menahem Yaari
Committee chair

Ofra Brandes
Committee coordinator
until Winter 2013

Emanuel Strauss
Committee coordinator
from Spring 2013

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Executive Summary: Findings, Conclusions and Recommendations

The Committee and Its Objectives

At the end of 2010, Dr. Shimshon Shoshani, then director-general of the Israeli Ministry of Education requested that the Initiative for Applied Education Research establish an independent committee of researchers to explore options for reorganizing the education system in Israel to adapt it to the capabilities and demands of the 21st century. In response to Dr. Shoshani's request, the Initiative established an expert committee headed by Prof. (Emeritus) Menahem Yaari of the Hebrew University of Jerusalem and President (Emeritus) of the Israel Academy of Sciences and Humanities. The committee began its work in the Fall of 2011, under the auspices of the Israel Academy's Initiative for Applied Education Research. After a year of activity, the committee met with the new Ministry of Education director-general, Ms. Dalit Stauber, (Dr. Shoshani's replacement), who reiterated the need of examining these educational challenges in light of current and anticipated changes in Israeli society.

To provide responses to these issues, the following objectives were set:

- To review research knowledge from Israel and abroad addressing educational system preparation for the 21st century; to critically evaluate this information and place it at the disposal of decision-makers and the public.
- To examine the relevance of international research findings for Israeli culture and society.
- To examine and describe the skills and competencies on which education of the young in our time should focus.
- To determine whether it is possible to generalize from local and state initiatives regarding preparation to the entire system, and how this can be achieved.

The committee gathered its information from meetings with senior education system officials, from fact-finding tours and discussions, from expert testimony, as well as from the status reviews and scientific literature reviews it commissioned.

It should be emphasized that the Ministry of Education (MOE) has in recent years been active with respect to all the topics discussed in this report, encouraging large-scale state-wide programs and even setting them in motion. Notable examples include: the "Courage to Change" ('עוז לתמורה') and "New Horizon" ('אופק חדש') programs to support teachers and the teaching profession; Avney Roshia ('אבני ראשה'), the institute for

The goals the committee set: Examination of the skills and capabilities required of education system graduates in the 21st century, assessing their implications for the system, and making recommendations for the system's improvement.

The committee took into account important work conducted by the Ministry of Education as well as actual changes that were made nationwide and within the framework of local initiatives.

The committee consolidated the final report based on the analysis of the collected theoretical and empirical information and added its recommendations.

The sources of the committee's information: Meetings with senior education system officials, fact-finding tours, and discussions, a symposium it organized, testimony from various experts, and commissioned status reviews and scientific literature reviews.

school leadership; the National ICT Program (Science and Technology Administration); cultivating higher order thinking skills (the Pedagogic Administration); "Assessment for Learning" (RAMA, The National Authority for Measurement & Evaluation in Education); the National Program to Reduce Violence (Psychological Counseling Service); extending compulsory education to include three and four-year olds in line with Trajtenberg Committee recommendations. Some of these programs, and others, are reviewed in Appendix 4 ("Summary of Relevant Fields of Activity at the Ministry of Education") and in Appendix 5 ("Symposium on "Pedagogy in the Information Age"). The committee took these Ministry of Education programs into account in its work.

Following deliberations and collection and analysis of further empirical material, the committee prepared this report containing its recommendations. The report presents a picture of the changes that have taken place in Israeli society during the close of the 20th century and beginning of the 21st, examines their implications for education system objectives and proposes recommendations in light of these changes and implications.

The present committee is not the first to address, from one perspective or another, this issue of the changes that need to be effected in the education system in order to meet 21st century needs. In recent years, several entities within the Ministry of Education carried out important and comprehensive studies relating to the education system in Israel as a whole (for example, the National Program for the Advancement of Education in Israel [2005] of the National Task Force for the Advancement of Education in Israel [Dovrat Commission, 2005]), or relevant to its various components (for example, two of the committees chaired by Prof. Miriam Ben-Peretz: "Matriculation 2000," a report of the Committee to Examine the Format of the Matriculation and Final Examinations [1994], and "Teacher Training in Israel in Changing Times" – a report of the Committee to Examine Teacher Training in Israel, the Ministry of Education, Culture and Sport, Jerusalem [2001]).

The findings of our committee are certainly not intended to replace the fruits of any of these preceding committees' labor. Our committee focused on theoretical and empirical information amassed in recent years pertaining to the issue of changes that have taken place in recent decades, on education system objectives that derive from these changes and on variables that may, under certain conditions, be of use in attaining them.

The document will be submitted to Ministry of Education officials following peer review, and in the summer of 2013, it will be available to the public on the Initiative website.

In recent decades, far-reaching changes in all aspects of life have taken place. This document reviews changes which, at least in principle, are expected to have a strong impact on the education system.

The information technology revolution has greatly affected methods of interpersonal communication, written and spoken language, access to information and how it is used, and patterns of thinking and problem solving.

Changes Taking Place in Recent Decades in the Education System Environment in Israel and Worldwide

During the second half of the 20th century and the beginning of the 21st century, far-reaching changes in all aspects of life took place. This document reviews changes which, from at least a theoretical perspective, are expected to have an especially strong impact on the education system.

The information technology revolution, which is still ongoing, has greatly influenced methods of communication, language, information usage, patterns of thinking and problem solving. In parallel, due to the information technology revolution and in light of other factors such as changes in culture and leisure consumption habits, the skills an education system graduate needs today in the labor market have changed dramatically: There is lesser need for mastery of information and data and, on the other hand, greater need for skill in solving complex problems; there is less need for simple decision making and greater need for analysis and synthesis of information; less routine work and more computer-based work; less individual, independent work and more teamwork based on interpersonal communication.

Globalization and the transition from a collectivist-socialist society to one that is free-market and initiative-based have brought about a gradual shift from collectivism to individualism and from solidarity to privatization. In Israel and other countries around the world, these have led to riches for the few together with growth of the lower class, meaning an increase in income inequality between society's different populations, and, as a result, a rising popularity of highly-paid professions and abandonment of professions such as teaching, where the wages are low. A central process that accompanied the demise of collectivism was the attempt to save public funds by acknowledging that public organizations, or those funded by the public, are obligated to report to the taxpayer regarding public spending and the results achieved – such reports constituting the basis for ceasing activities that are not productive. In consequence, methods designed to make services more efficient were integrated into public systems: measurement of achieved outcomes; attempts at greater efficiency through privatization – transfer of different functions that were previously provided directly by the state into the hands of private business.

The role of parents as responsible for the development of their children was affected by the changes that have taken place in the structure of the family nucleus resulting from various factors, among them, validation of the quest for personal development and personal fulfillment. Over the years, in developed countries, there has been a great decline in the average number of persons per household, and many children are raised in single-parent families.

These changes have led to an increase in income disparities in Israel and to a decrease in the time parents can devote to their children. Both these factors increase the expectation that the school system will provide for what is lacking.

The information technology revolution has greatly affected methods of interpersonal communication, written and spoken language, access to information and how it is used, and patterns of thinking and problem solving.

The number of parents involved in their own advancement or who must work longer hours has grown and the number of hours they dedicate to their children has decreased. This has brought about a decline in parental authority and an increase in behavior problems among children and youth (drugs, violence and discipline problems).

Israeli society today is characterized by social and cultural groups separated from one another and to a great extent, even alienated from one another.

The committee decided to focus on problems related to education for a knowledge-based society and on education for a culture-based society. The very core of education takes place on two levels: internal cognitive and external interactive. The first is the basis for a society of knowledge and the second for a society of culture.

As part of the right to personal fulfillment, women have entered the workforce and this is but one of many changes related to the demand for equal rights between the genders. This demand has altered the public discourse and the stated norms on many issues related to gender equality. Prominent examples are the demand for equal division of housework between the genders, proportional representation of women in various professional disciplines including engineering and technology, women's rights over their own body and prevention of sexual harassment.

Another change is manifested in the number of hours parents devote to their children: today, both men and women dedicate many more hours than in the past to their sources of income and to enlarging the family budget. Likewise, the number of parents involved in their own advancement and self-fulfillment is growing and they invest less time in their children. These, together with the disintegration of collective moral cohesion, have brought about a decline in parental authority and an increase in behavior problems among children and youth including drug use, violence and discipline problems.

The changes, which began in recent decades, dramatically influenced social processes in Israel. Significant portions of Israeli society have shifted from the Zionist-socialist ethos to liberal-democratic ideals. The melting-pot ideology has eroded and in contrast, the ideology of individual freedom, pluralism and multi-culturalism has gained in strength. Israeli society today is characterized by different social and cultural groups, separated one from another and to a great extent, even alienated one from another. Separation is evident in language, culture, history and heritage. The disparities between Arabs and Jews, between ultra-Orthodox, religious and secular, and between rich and poor have especially significant implications for the education system.

Following examination of the changes and their implications, the committee decided to focus on problems related to education for a knowledge-based society (i.e., acquisition of 21st century skills, knowledge and literacy, academic achievement) and education for a culture-based society (appropriate social behavior, fostering distinctiveness of different populations and building on what is shared by them). This choice was informed by recognition of the importance of these two facets and their being necessary elements in preparation for life and integration in a modern, demanding society. An example of a critical problem the committee chose to address and which focuses on preparing education system graduates for immersion in today's society is the gap between mastery of facts and the ability to make use of these facts. Today, it is argued that repeating and memorizing facts without explaining them or drawing conclusions from them, creates knowledge whose fate is disappearance "immediately after

the next test" (Resnick, 2010). A promising solution based on current research is "deep-learning," defined as a process taking place on two levels: 1. an internal, intra-personal cognitive process manifested in skills such as flexibility, initiative, estimation of variance, diversity and meta-cognition and, 2. an external interactive process manifested in interpersonal skills such as communication, collaboration, responsibility and conflict resolution (NRC, 2012). These two levels, the internal-cognitive and the external-interactive, relate to the two facets the committee chose to address: a knowledge-based society in which the student's achievement is based on an internal-cognitive process and a culture-based society in which advancement relies on interactive social abilities.

Changes and their Implications for Educating for a Society of Knowledge

Implications for Knowledge and Literacy

A major problem in Israel's education system, as in those of other countries, is the failure to meet the expectation that, as a result of changes stemming from the information technology revolution and significant changes in the labor market, schools would provide students with what they will need as graduates, namely "21st century skills". These include the ability to master complex problems, analysis and synthesis of information, systems thinking and creativity, interpersonal communication and teamwork, knowledge transfer and its use to handle diverse problems and issues, critical and evaluative abilities and their use in examining alternative solutions, self-discipline and time management, and skilled use of computerized tools.

A nother problem is the fact that academic achievements of Israeli students are still low according to various parameters such as, the percentage entitled to a matriculation certificate and meeting minimum university entrance requirements. In addition, the variance in Israeli students' achievements is among the highest in the world, with a significant proportion of students – many of them belonging to the Arab population or the Jewish population living in disadvantaged areas – attaining low academic achievements. Furthermore, there is concern regarding an overemphasis on standardized tests such as the Israeli MEITZAV (Hebrew acronym for "Indices of School Effectiveness and Growth") or the international PISA (Programme for International Student Assessment) tests. These tests are important for evaluating what has been achieved and for learning the lessons needed, however, the pressure on showing achievement may lead to overuse of these indices and methods of evaluation. Indeed, there is evidence indicating undesirable effects that may accompany non-optimal use of these tests. For instance, literacy and knowledge in subjects and areas in which student

The school will impart "21st century skills" to its students: analysis, thinking, communication, self-discipline, teamwork, use of computerized tools, and more.

achievement is not tested at all have been negatively impacted, as have subjects in which students are tested on only some of the material studied.

Recommendations for developing literacy:

- **Developing and promoting deep learning, and transfer abilities** through teaching-for-understanding which requires flexible application of knowledge in different contexts
- **Developing meta-cognition**
- **Teaching through developing productive and shared academic dialogue**, which is reciprocal, open and inquiring, rational and based on discipline-specific knowledge – a discourse which provides learners with analytic tools and accustoms them to productive thinking patterns

Below are a number of practical actions advanced by an American expert committee (NRC, 2012) which incorporates the three recommendations above:

- (1) Encouraging students to flesh out points, questions and explanations. Examples of such interventions on the part of teachers are: repeating the student's contribution verbatim while checking to see his peers' degree of comprehension of what was said, asking the student to repeat another student's explanation, asking the student to add his own explanatory points to that of his peer's, encouraging the student to continue contributing, asking the student to clarify the reasons for his position, incorporating time for thinking within the discussion.
- (2) Enlisting students to take part in challenging tasks while giving them support through training, feedback and encouragement, and motivating them to observe and reflect on their own learning processes and comprehension.
- (3) Teaching – conducted step by step and supported with examples illustrating the way students can execute a specific procedure in order to solve a problem, all through the use of database of fact-based examples.
- (4) Nurturing student motivation by linking topics of study to their lives and areas of interest, recruiting the students to work cooperatively to solve a problem and drawing their attention to knowledge and skills they are developing.
- (5) Professional development of teachers, training them to use

productive discussion methodologies, (specific discussion practices whose role is to help students formulate their thinking and express their thoughts publicly during a productive dialogue among students), tools that cultivate awareness of the importance of discussion in the classroom.

- (6) Formulating a curriculum that leaves room for teachers and students to discuss selected topics in a profound and significant manner and encourages such discussion (even if in some cases this leads to limiting other topics included in the curriculum).
- **Continued and accelerated efforts to implement new technologies that support learning:** Utilizing innovative technologies is essential for reducing the gap between the environment in which the child lives and the school learning environment. It is also important for developing skills the student has to acquire in the context of those needed today; it is wasteful not to fully exploit current technological potential as a method for learning.
 - **An individualized program for advancing each student:** Promoting ongoing individual feedback through "assessment for learning." This kind of evaluation is performed by collecting data on learning, interpreting them and drawing conclusions regarding the degree teaching goals have been achieved. There is a need to perform assessment for learning and to provide ongoing, consistent, continuous, specific feedback to the student, focused on individualized instructions regarding how to improve.
 - **High expectations:** Expectation that the student has the capacity to succeed, encouraging students to set a high personal standard and selecting the corresponding learning track. The teaching staff's and school administration's expectation of success and achievement must be expressed by encouraging study of challenging fields and subjects – to the extent possible with respect to the student – and by encouraging and formulating a realistic sense of self-efficacy in the student and continuously tracking each student's progress.

It is recommended that the integration of learning technologies be accelerated both as part of the skills required today and also in order to better exploit the potential of current technology.

It is recommended that "assessment for learning" be promoted; this takes place through ongoing gathering of data on learning, their interpretation and drawing conclusions on the degree teaching goals have been met and the extent teaching is adapted to each student's progress.

In recent decades the income gap between affluent and disadvantaged families is widening and along with it, the gap in their children's education and achievements.

The teacher must encourage the student and convey the expectation that s/he has the capacity to succeed.

In order to reduce the disparities between populations a policy of greater investment in schools that serve weaker populations should be adopted – individual mentoring, frequent feedback, supplementary hours and student-specific remedial programs.

Implications of Equality of Opportunity and Reducing Disparities

The social and economic disparities between different populations in Israel, as around the world, are growing at an increasing rate. Among the reasons for the growing gaps in income we can enumerate the freeze in earnings of low-income families, new technologies that grant high wages to professionals, most of whom are from well-established socio-economic backgrounds, privatization and out-sourcing to countries where wages are low at the expense of local low-income workers, and proliferation of single-parent families whose economic status is often relatively low. Parallel to the widening income gap between well-off and low-income families, the educational level and achievement gap between children in these groups is also widening. As a result, there is impaired equality of opportunity among students, with their special and various abilities remaining unrealized – especially for those from disadvantaged backgrounds. The net effect of the above factors initiates a vicious cycle – creation of disparities in the level of education between different classes, which leads to diminution in the ability of the next generation's children to earn a living, which causes an increase in income inequality, which then instigates an additional accelerated growth of the education gap.

Recommendations – Allocating Differential Resources

- **Change in investment of budgetary resources and personnel:** To reduce between-population disparity it is not enough to further equality in resource distribution. It is suggested that a policy of greater investment in weaker populations be adopted, corresponding to the needs of the students and their communities. There is reason to consider differential addition of monetary resources to local authorities and specific monetary supplements to teachers and principals working among disadvantaged populations, particularly the Arab population and the Jewish population living in distressed areas (see details in the next paragraph). Special assistance to schools, in which there is a mix of students from different socio-economic backgrounds and students from low socio-economic backgrounds, which would include individual mentoring, high expectation and frequent feedback, supplementary hours and student-specific remedial programs.
- **Encouraging teachers to teach students from low socio-economic backgrounds:** Under certain conditions, the education system can reduce inequality stemming from variations in family background if it can identify effective teachers and succeed in steering them toward

population concentrations and schools that serve socio-economically disadvantaged populations (conditions for navigating teachers to these areas will, in part, include the length of time teachers will serve a disadvantaged population and supplements to their salary). A strategy that may be useful in this context is investing these teachers' time in supplementary hours and individual hours within small groups (such a strategy is currently used in the "New Horizons" framework).

- **Focus on early childhood:** Research findings demonstrate that early intervention with children from low socio-economic status (SES) backgrounds when they start school are preferable to those carried out with older children. It is preferable to engage more in prevention and less in remediation. It is likewise important to achieve a true continuum of education system activity from early childhood to elementary school and other, later frameworks.
- **Parent participation:** Preparation of a special cooperation program with parents of children from disadvantaged backgrounds. Because there are parents from low socio-economic backgrounds who do not have access to resources which parents from middle or upper classes do (attention paid to their children, special consideration of parental feedback to their activities, etc.), it is proposed that low SES parents receive training on how to supervise the learning process: how to evaluate the teacher's activities; how to correct the teacher's inaccurate assessment of, or reactions to, their children; how they can influence the teacher to devote more attention and other resources toward their children's advancement, etc. It is likewise suggested that expectations shared by them and the school regarding their children's success be articulated and that their cooperation be attained in reporting to teachers regarding homework preparation, absences and behavior problems.
- **Joint decision-making:** Formulating ways for gaining the cooperation of disadvantaged populations in determining needs and making the relevant decisions. The intention is to empower local leadership, to partner in change programs, identify needs, and for all the relevant local systems to learn the lessons needed – this includes local authorities, local representatives of government ministries, non-governmental organizations and obviously, school principals, teachers and parents.
- **Strategy for improving schools that serve low-income populations:** According to the professional literature, the chances of improving elementary schools that serve low-income populations are greater than improving middle and secondary schools. It is thus recommended that most of the change efforts be concentrated on these schools. It is also suggested that the strategy take into account the experience at schools

An additional recommendation: strive to empower the disadvantaged population's local leadership including collaborating on change programs, identifying needs, and lessons learned by all the local systems involved.

The disparities between the populations are not only in salary and opportunities for acquiring knowledge, but find expression also in alienation and even hostility between populations.

Under certain conditions, school autonomy can enable cultivation of the unique in the population it serves. School autonomy must be regulated to ensure that the school remains committed to principles of accountability, self-assessment, self-criticism, and mutual respect for all citizens of Israel, etc.

that serve disadvantaged populations, which has shown that at times, splitting a school into two separate schools and running a separate intervention program in each one can help achieve change.

- **Education for leisure:** Expanding activities in the area of leisure while paying special attention to the Arab population and the Jewish population in distressed areas.

Changes and Their Implications for Educating for a Society of Culture

Implications of Changes for the Problem of Disparities between Different Populations in Israeli Society

The gaps between populations discussed in the preceding section are not only a problem of disparities in income and opportunities to acquire knowledge, but also of alienation and at times, even of hostility between populations. Israeli society is characterized by social and cultural groups separated from one another and to a large extent, alienated from one another. Separation is manifested in language, culture, history and heritage. There are particularly significant implications for the education system with respect to the differences between Arabs and Jews and between ultra-Orthodox, religious and secular. Socio-cultural separation is a critical factor that affects the large differences between populations of students on important parameters: the sense of not belonging to Israeli society and the level of academic achievement, which is low in certain sectors. These differences present a special challenge in the context of the Arab population and the ultra-Orthodox population. The numerical growth of minority groups has transformed treatment of these issues and their implications into a crucial issue in Israeli society.

Recommendations for Building up Shared Elements in Israeli Society while Fostering the Distinctiveness of Different Populations

- **School autonomy and the conditions needed for its implementation:** School autonomy can enable cultivation of the unique among the population it serves. Autonomy would be expressed in providing options for the school or community to determine their own unique content. Learning based on the cultural assets of the group to which the student belongs can serve to formulate a knowledge base, a sense of belonging and self-worth for these students which will, further on down the line, enable a dialogue of mutual respect between students from different cultures. In addition, it should be noted that

providing broad autonomy for schools grants them the ability to adapt to a frequently changing environment, to renew, to become more efficient, to identify the changing needs of students in advance and make decisions accordingly. In light of frequent social changes and their significance for the education system environment (as detailed in chapter 2) it is crucial that schools be able to adapt quickly, so that providing autonomy to schools has special significance. Autonomy will be expressed in curricula beyond the common core subjects, in the ability to make decisions concerning independent management of the budget, recruitment and management of personnel and formulation of pedagogic policy. At the same time, school autonomy should be regulated order to ensure that all schools maintain principles of accountability, self-assessment, self-criticism, critique, external assessment and audits so that autonomy is put to beneficial use. Similarly, within the framework of autonomy, there must be a commitment to conduct activities that recognize and respect other population groups, as detailed in the recommendations below.

- **Recognition and respect for the other:** Building on the shared in Israeli society begins with activities to recognize the other who is different in his/her culture or religion. Continuation of the activity will include joint meetings and activities focused on shared academic and social goals. Recommended specific activities on this topic are studying the cultures of the majority and minorities, translating knowledge into personal experience and feeling for the student, developing communication skills with individuals from other cultures, encouraging social justice, reducing prejudice and developing democratic practices, forming an environment that opposes racism, avoiding placement of children in special education or gifted classes which are dominated by any one particular population group, relating to a minority's history, language and culture and integrating them into the curriculum, integrating subject matter from diverse cultures into material studied, structuring knowledge, concepts and topics from different perspectives, maintaining ongoing dialogue between groups, incorporating values of equality in teaching, providing opportunities for participation of guest teachers from different schools that belong to other populations, holding joint learning groups with students from different schools.
- **Lessons from the Israeli experience:** Although there is no solid empirical basis yet for the success of experiences in imparting pluralism, there is no doubt that establishment of experimental schools whose stated objective is pluralistic education must be continued. The few examples included in this document corroborate the many options that exist for recognizing other populations, for reducing disagreements and

Building on shared elements in Israeli society begins with activities to recognize the other whose culture, religion, gender, language, nationality, or physical, economic and intellectual abilities are different.

It is recommended to continue the establishment and development of experimental schools whose aim is education for pluralism and nurturing the elements shared by different populations in Israel.

General societal problems such as lack of discipline, violence and behavioral disorders among youth also penetrate the school setting: tens of percent of students report that they have experienced violence, have seen incidents of vandalism and find it difficult to learn due to disruptions during the lessons.

In general, a student who is interested in the lessons, believes in his abilities, works in an environment that challenges him, that is suited to his world and enriches it, is a student who engages in appropriate social behavior.

A school climate that fosters a sense of belonging and community contributes to creating a less violent environment.

cultivating the shared among different populations in Israeli society. It is suggested to continue giving a central place to experimental schools working toward pluralism and even to give other schools, which are interested in adopting this challenge, a chance to do so using a model suited to their needs. As a rule, following a review of whether it is possible to pair the school with another institution, a strategy should be implemented of schools learning from the experience and success of other schools.

Changes and their Implications for Schools' Social Climate

- Problems of discipline and manifestations of violence and behavioral disorder among youth, which are part of a general and acute social problem, are expressed in the school setting as well. Studies show that tens of percent of students report having experienced violence and being exposed to incidents of destruction of property. They find it difficult to study due to disruptions in class, feel that school is not a safe place and are concerned about incidents of violence against their person carried out by other children.

Recommendations – Shaping Appropriate Social Behavior

- The challenge as the solution:** A student who is interested in class lessons, believes in her abilities, works in an environment that challenges her, that is suited to her world and enriches it, is a student who generally engages in appropriate social behavior. It thus stands to reason that adopting the recommendations made in the previous sections – incorporating a strategy of "deep learning" and "assessment for learning," using up-to-date technology aids, providing special assistance for needy students, and more – is the natural solution for reducing problems of discipline and violence.
- Everyone is a partner:** School climate that is characterized by a sense of belonging and community creates a less violent environment. An atmosphere of trust and cooperation between students and teaching staff as well as parents involved in school affairs, particularly as it relates to their daughter or son, also make a contribution. Specific strategies suggested whose use should be considered are: parental presence in the school yard, dialogue between students and teachers regarding problems that arise in school and their resolution, giving authority to student councils, integrating students in community activity outside of school and involving community entities such as youth movements, community administrations, and senior citizen homes in the school.

- Personal security:** It is proposed that teachers' skills for coping with incidents of violence be further developed, and multi-system activities geared toward preventing violence be conducted, these being integrated and coordinated with the local authorities, the Ministry of Social Affairs, the Israel Anti-Drug Authority, school staff and parents. It is also suggested to promote rehabilitation of students suffering from severe problems of violence, treating them within the school framework but also expanding and adding short-term-stay education-institutional frameworks, and treatment and rehabilitation institutions.

The systems' activities to prevent violence must be coordinated with the local authority, the Ministry of Social Affairs, the Israel Anti-Drug Authority, school staff and parents.

System Support for Attaining the Objectives

It is proposed that Ministry of Education support for attaining the above objectives focus, first and foremost, on the following issues: 1. prioritizing and updating education system goals; 2. improving further teaching quality; 3. changing strategies for attaining objectives; 4. attaining objectives in their entirety; 5. establishing a national program for education.

Prioritizing and Updating Education System Goals

The changes that have taken place as a result of the information revolution and of changes in perceptions, ideologies, and ways of thinking and behaving are most significant in their scope and implications for the education system. The Ministry of Education is prepared for and responds to changes through wide-ranging programs, although according to the above-mentioned sources, the modifications made are still insufficient, mainly in the following areas: 1) imparting 21st century skills; 2) improving achievement and literacy; 3) promoting equality of opportunity; 4) educating for appropriate social behavior; 5) cultivating the distinctiveness of each of the different populations in Israeli society and building on their shared elements.

The committee recommends that the system prioritize the following goals: imparting "21st century skills," improving achievement and literacy, promoting equality of opportunity, educating for appropriate social behavior, cultivating the distinctiveness of each of the different populations and building on their shared elements.

An Additional Improvement in Teaching Quality

Findings indicate that even today, despite implementation of the reforms such as "New Horizon" and "Courage to Change," there is still a great deal of teacher attrition and turnover in the system, problems in the quality of the teaching staff and leadership, in general, and in the Arab population and in disadvantaged areas, in particular.

It is recommended that the attributes of teaching be redefined so that they include skills in managing academic dialogue between the teacher and students and between the students themselves, and the use of "assessment for learning."

Recommendations for Additional Improvement in the Professional Quality of Teachers

- Changes in the definition of the teacher's role:** An up-to-date definition of the attributes of quality teaching as the basis for a policy

Recruiting better personnel and through professional development, keeping them in the system, can greatly advance the status of teachers.

Professional development must include peer observation and mutual feedback, and should be held jointly for all the relevant teachers. It should be intensive, require long-term integration and be combined with other development programs in the school, etc.

of personnel development is recommended. These attributes include skills used in managing academic dialogue, "academically productive talk," "assessment for learning," and the ability to self-monitor in order to improve teaching quality.

- **Recruiting better personnel:** Further improvement in teacher status is the key to recruiting better personnel and can be attained with the help of attractive remuneration as well as licensing tests to help screen unsuitable candidates and to convey a message to the public that teaching requires unique skills not possessed by all. Improving teachers' working conditions, possibilities for advancement, financing study during the training period and stipends for living expenses would be a significant contribution towards achieving this objective.
- **Maintaining a quality workforce in the system:** The outstanding factors that are likely to contribute are wages, progression along a career ladder, professional development, support in reducing discipline problems, professional mentoring and feedback, teaching small classes, and providing time within the work schedule for planning lessons. In parallel, identifying teachers who are not suitable and removing them from the system should be considered.
- **Professional development through peer feedback and mutual learning:** Tools that should be considered in this context are: peer observation and mutual feedback, use of video, observation and analysis following the lesson (special training is needed for the proper use of these tools), joint lesson planning with the assistance of the professional knowledge particular to each teacher, and consolidating the knowledge aggregated from all the teachers.
- **Development through training during the career phase:** It is desirable that training will: 1) be held jointly for the school's entire teaching staff at the same time (excepting pedagogic topics in specific subjects or for certain age cohorts); 2) be intensive – training should be intensive so that it encourages participants to continuously invest time and effort over a long period; 3) be relevant – training should be relevant to the teacher's daily practice; 4) include teachers' long-term commitment to apply what was learned; 5) incorporate products of training in the teacher's ongoing work; 6) is combined and coordinated with the school's other development programs and if possible, even be a part of a comprehensive system of school reform and not an isolated component that does not integrate into the larger picture of change efforts.

The Change Strategy – The Missing Link

A review of efforts undertaken in Israel at the local and national levels indicates that while local changes often meet with much success, their implementation on a national scale is usually unsuccessful. Change strategies made through national reforms do bear certain fruit but their application did not generate significant change toward achieving the stated goals.

In Israel, it seems that activities have essentially taken place on two levels: One is the establishment of a "Pilot Projects and Initiatives" division within the Ministry of Education, which successfully works to foster innovative schools. However, implementation on the national level of programs proven to be successful, locally, meets with opposition and obstacles. The second activity is development of national initiatives resulting in comprehensive programs including recommendations and means for nationwide implementation (e.g., the Dovrat Report); their application in the field, however, is only somewhat helpful.

In light of the literature addressing organizational change, such results are not surprising. Implementing change and innovation does not take place naturally or easily. On the contrary: individuals and organizations have a tendency to leave things as they are. Changes and innovations require many resources – time, effort, money, and more. In general, there is built-in resistance to innovations, and adopting them is an ongoing and complex process. Change typically takes place in stages: In the beginning there are the innovators, this is followed by integration by early adopters, after which there is acceptance by additional circles of adopters, until it reaches a critical mass of users and then, general adoption occurs (Rogers, 1983).

Thus, it is probable that Ministry of Education efforts are missing an important link – activities aimed at attaining a critical mass of education networks or individual schools that are themselves not necessarily innovative but possess the vital status needed to join the second circle of adopters – strong leadership, the teaching staff's willingness to invest in change and support it, willingness on the part of the regional authority to help with financial resources, motivation on the part of the parents' association to engender change, and more. In consequence, we recommend examining the option of finding a way to cultivate such education networks and schools that would join a program in which there are components that support adoption of the required changes.

There is an important link missing in the efforts to achieve change in the education system – arriving at a critical mass of school networks or schools that have the attributes needed for joining the second circle of change adopters.

Implementing Changes in their Entirety

The general picture emerging from the findings amassed is that promoting one solution to a problem is tied to promoting solutions to other problems. In other words, this is not a "zero-sum game" in which meeting one requirement and advancing towards the solution of one problem is made at the expense of promoting another solution. On the contrary, implementing a solution to the problems as a whole is likely to be efficient and effective precisely because all its components reinforce one another. Thus, for example, developing innovative curricula requires training teachers to implement them; granting autonomy to school management is a necessary condition for executing the changes the school requires to promote student achievement; reducing disparities and discipline problems in the classroom contributes to improving student achievement. Simultaneously relating to all the sub-systems relevant to change is required, as well as taking into account the interests of different parties including politicians and principals, teachers and students; getting them to cooperate and motivating them are the main keys to success.

Simultaneous execution of the solutions can, under the right conditions, create a learning environment that will enable:

- The *students*, within the framework of their studies, to be involved with issues and topics close to their hearts and aspirations, to find interest and challenge in their studies, to reach higher achievements in school. Under these circumstances, it will be possible to provide increased resources to advance students who need them.
- The *teacher* to broaden skills with new teaching methods and use of new technologies, to benefit from the enhanced professional authority of teachers and the reduction of discipline problems.
- The *curriculum* to be perceived in the minds of students, parents and the wider community as one that trains students for the 21st century and corresponds to the student's needs and that of society.
- The *school* to improve school climate, expand teachers' professional authority, reduce disciplinary and behavioral problems, and rally round a vision and present actual achievements.

The rate of growth of real investment in education in Israel is lower than in developed countries. It is suggested that public investment be expanded and that it be based on a long-term program.

A National Program for Education

During the last decade there was indeed an increase in Israel's education budget. However, the rate of growth of real investment in education in Israel is lower than in other developed countries. (Economics and Budget

Administration, Division A Economics and Statistics, September 2012, slides 51-52). In 2009, the most recent year for which there is data available, the annual public expenditure for education per student in Israel was more than one third lower than the average expenditure in OECD countries (OECD 2012, Indicator B1). It should be noted that in recent years the public expenditure per student in Israel has increased, particularly for funding the reforms led by the Ministry of Education.

In addition, in particular, it was found that the relative investment in education research in Israel is one thousandth of the national investment in education. In the United States it is approximately ten times that proportion (Chen, 2004). We were not able to locate a current report or general information about the proportion of its budget the Ministry of Education invests in education research. A long-term national program for education that would seek to expand public funding per student to the level that exists in OECD countries and to report on the relative proportion of the general education budget allocated to education research would provide a solution to these problems. It is also suggested to examine the possibility of establishing a National Council on Education in which there would be representation of the Ministry of Education, academia and hi-tech industry, among others. The Council would be assisted by pedagogic experts and also by experts in other areas including change management.⁴

It is suggested that the possibility of establishing a National Council on Education be examined, which would include MOE, academia and hi-tech industry representation. The idea to establish a National Council on Education appears to be a right step in a worthy direction.

⁴ While this report was being edited, the committee members and report editors were informed that the Minister of Education intends to establish a committee of this kind.

1. Introduction

1.1 Background

At the dawn of the 21st century, the education system in Israel is faced with a reality different than the one in which it set its course and the tenor of its activities. Changes that have taken place in the structure of the family, in culture and society, in the perception of the state's role and in the labor market, alongside an abundance of accelerated technological developments – compel the system to reconsider its preparedness and modes of operation. The pace of change demands that the system's examination of itself and its methods of adapting to reality be dynamic and ongoing – it is no longer possible to think in terms of solutions that will be relevant for many years.

The education system is one of the more significant systems responsible for preparing society's youth to properly and actively integrate into society.

Thinkers and researchers agree that changes and developments in all the areas listed above will continue to take place for the foreseeable future. This situation requires the system to prepare and operate in the shadow of uncertainty with respect to the nature and essence of the future for which it is educating its students. This situation is not unique to Israel as all developed countries report the same, though in searching for solutions, the particular conditions in which the system in Israel operates must be considered.

It was against this background that at the end of 2010, Dr. Shimshon Shoshani, then the MOE's director-general, turned to the Initiative for Applied Education Research with a request to establish an independent committee of research scholars that will address the broad question: How can the education system prepare to provide for society's needs in another 18 years? Defining such a time frame indicates the realization that we must think today about how to prepare children now starting out in the education system so that at the end of their studies they will be equipped to successfully contend with a different reality and not necessarily one that is clear and known.

At the beginning of 2012, Ms. Dalit Stauber, who replaced Dr. Shoshani as director-general, met with the committee and confirmed the need and the expectation that the committee would delineate strategic lines for policy and noted that in our era, planning even five years ahead includes uncertainty on the one hand, though on the other, many of the things that will be designated as appropriate for the future are already present in some form – whether full-fledged or nascent – in today's system.

This is the place to mention that in recent years a change in atmosphere has been wafting through the field of education. Contributing were the

Changes that have taken place in the structure of the family, in culture and society alongside an abundance of accelerated technological developments – compel the education system to reconsider its preparedness and modes of operation.

The system already contains many of the seeds of things that will be designated as appropriate for the future.

The main goals the committee set were:

1. review of relevant research concerning preparing the education system in Israel for the 21st century;
2. examination of the competencies and skills upon which education of the young in our era should focus;
3. determining whether it is possible to generalize from local and state initiatives regarding appropriate preparation to the entire system

reforms of Prof. Yuli Tamir during her term as minister of education, which continued with her replacement, Gideon Sa'ar, during his term. It may be assumed that the social protests of the summer of 2011 also made their contribution to this change as the younger generation related to the state of affairs in education in Israel. More and more educated and experienced young people are today seeking meaning in work as teachers and educators.

To respond to these issues, the committee set the following goals:

- To review research knowledge from Israel and around the world concerning the topic of preparing education systems for the 21st century, to critically appraise it and to place it at the disposal of decision makers and the public.
- To examine the degree of relevance findings from around the world have for Israeli culture and society.
- To examine and describe the competencies and skills upon which education of the young in our era should focus.
- To determine whether it is possible to generalize from local and state initiatives regarding appropriate preparation to the entire system, and how this can be achieved.

The committee began its work by examining the changes that took place at the start of the 21st century. It based its review mainly on theoretical sources which relate to changes in all aspects of life and especially topics that relate to or impact upon the education system. Among these, the committee reviewed the shift in values society espouses and its influence on the education system, accelerated technological development and its effect on education system roles and functions, as well as changes that took place in Israeli society. In due course, the committee examined the educational objectives that should receive high priority for implementation and be updated as needed. Empirical material was collected for each objective in order to describe the variables likely to support its attainment or those that would make it more difficult, and to point to an overall set of circumstances that would enable progress. To conclude its work, the committee submitted recommendations based on the theoretical and empirical material reviewed, which can help policymakers in their efforts to identify the modifications needed today in the education system.

5. Summary

This document focuses on the major changes that occurred in the 20th century and the beginning of the 21st century, their implications for some of the objectives of the education system, and the need to prioritize, update and implement them based on current knowledge, supported by recent empirical findings.

A significant part of the disagreements regarding the objectives of education stems from different opinions and points of view vis-à-vis the definition of knowledge and its value. Many believe that the objective of education is to enable human beings, as individuals and as members of society, to realize their full potential, while providing the appropriate knowledge and tools to enable them to find their place in the labor market, in society and in the community.

The 21st century is experiencing a dramatic technological revolution. The society in which we live is becoming increasingly diverse, global and media-saturated, and this process is continually accelerating. It is difficult to predict what the world will be like in the future, yet the education system is obligated to prepare students, as much as possible, for life in this changing world. The students encounter new issues that constantly arise – global warming, shortage of natural resources, hunger, health issues, the population explosion and other social and environmental questions. These changes oblige them to know how to communicate, function and create personal, social, economic and political change at the local, national and global levels.

The developing technologies and the globalization they help engender have provided unlimited possibilities for interesting discoveries and developments such as new forms of energy, scientific breakthroughs, environmental renewal of damaged sites, media, research in space and in the ocean's depths – the opportunities appear to be unlimited.

The technological, social and economic changes (the information technology revolution, privatization, pluralism, recognition of the need for self-fulfillment, polarization and widening of gaps in achievement, education and income) that have occurred and will continue to occur in the 21st century and onward, have important implications for the practice of education in all its aspects and for all involved in it – the school, the curriculum, the teachers and the students. In light of these changes, we must foster among the pupils (the citizens of the future) the skills and abilities that are appropriate for the 21st century.

The current committee is not the first to study one or another aspect of the

The report focused on recently amassed theoretical and empirical information regarding the changes that took place in the past decades, the education system goals stemming from them and the variables that may, under certain conditions, aid in their realization.

Many define the goal of education as giving individuals the possibility of realizing their full persona potential through provision of appropriate knowledge and tools that enable assimilation in the labor market, society and community.

In recent years, a number of entities in the Ministry of Education conducted important and comprehensive studies on the education system in Israel. The results of our committee do not, of course, come to replace the fruits of the efforts of any of these parties.

changes required in the education system and how it must adapt to meet the needs of the 21st century. In recent years, a number of committees carried out important and comprehensive studies on the education system in Israel as a whole (such as the National Program for Education, 2005, of the National Task Force for Promoting Education in Israel [the “Dovrat Committee”]) or on various components of the education system (such as two of the committees chaired by Prof. Miriam Ben-Peretz: “Matriculation 2000,” a report of the Committee to Examine the Format of the Matriculation and Final Examinations [1994], and “Teacher Training in Israel in Changing Times” – a report of the Committee to Examine Teacher Training in Israel [2001]).

The results of our committee do not, of course, come to replace the fruits of the efforts of any of these committees.

Our committee focused on theoretical and empirical information collected in recent years about the changes that have occurred during the past decades, on the objectives of the education system that emerge from these changes, and on the variables that could, under some circumstances, help to achieve these objectives.

This document has various limitations. First of all, it should be noted that its point of departure – the changes that have occurred – is based mainly on a review of descriptive and theoretical material. Secondly, we could not, of course, address all of the changes, but only the ones that seemed to us to be particularly significant. Here we should reiterate a point noted in earlier chapters – that this report does not focus on all the goals of education, but only one those which should be prioritized or updated in light of the changes that have occurred.

Another limitation pertains to the validity of the data upon which the recommendations are based. Most of the recommendations in this document are based on empirical material. However, most of the empirical material we used is taken from studies conducted in different countries, primarily in developed countries, and only a few of the studies were conducted in Israel. This point is important because on various important parameters – the disparities in achievement between weak and outstanding students (Ben David, 2011), demographic variables such as average family size (Feniger & Shavit, 2010), the level of students’ discipline (Shavit & Blank, 2010), and more – there are significant differences between Israel and other developed countries. Nonetheless, it should be noted that the studies reviewed are mostly large-scale; some are even “meta-studies” that collected data in various countries, using many different methods and means of sampling. These characteristics enhance the external validity of these studies and allow us to assume that their findings – or at least most of them – are also valid here. Although the empirical information reviewed here,

despite its limitations, enables a picture of the state of affairs to emerge and even for recommendations to be made, the committee nonetheless believes that more should be invested in education research in Israel, especially in the following areas: a. the field of teaching and learning research is not sufficiently developed in Israel and should be more developed; b. very little knowledge exists regarding the methods for implementing educational policy in practice in the classroom and on the effectiveness of different interventions; c. much knowledge has accumulated abroad on the efficacy of teaching strategies and professional development for teachers but their suitability for the Israeli context (education system structure, different needs, the culture, etc.) has hardly been examined; d. the scant systematic research that does exist focuses mainly on education in the Jewish sector, and research on education among the Arab and ultra-Orthodox sectors is lacking.

It should be noted that the recommendations are at the basic level of “charting a course.” Their translation to the operative level, for implementation at the field level, is not simple and will clearly require a considerable investment of budget, time and effort. Throughout this document the difficulties expected in implementation have been noted. The major ones are:

- In the absence of a consensual and budgeted national program for education, and under conditions of uncertainty, there is difficulty in planning for the long term and practically implementing the national reforms as well as more limited innovations.
- Lack of knowledge on the global level and even more so in Israel, also leads to decision-making under conditions of uncertainty, which can result in erroneous steps being taken and waste of effort, time and financial resources.
- The findings described in this report lead to the conclusion that independently implementing one objective or another will lead to unsatisfactory results, and as such, they should be implemented as a whole. The advantage is that the effort of attaining one goal will contribute to achieving the other. Admittedly, there is difficulty involved in the complexity of the change, in the implications that efforts in one direction have for another direction and for the scope of required financial and organizational means. For example, integrating innovative learning programs is subject to teacher training programs, in obtaining their cooperation, in enlisting the support of principals, in adapting and integrating computer-based technologies, etc.
- Opposition to adopting innovations, which accompanies any reform, is likely to be particularly strong in the education system due to the many entities that are active in it or impact upon it and also due to the emotional-ethical involvement of many of these parties.

It should be noted that among this document's limitations is its consideration only of the changes that seemed to us to be significant and then, only those that should be placed high on the list of priorities. Moreover: Most of the recommendations rely on empirical material taken from research conducted in different countries, and only the minority was conducted in Israel.

The recommendations made serve to “chart a course.” Translating them to the operational sphere and the field is not simple. It involves coping with obstacles and will probably require a significant investment of budget, time and effort.

Implementing the recommendations involves difficulties, some of which can be addressed through an authorized and budgeted state program for education, support for conducting research and accumulating the required relevant knowledge in Israel, combined integration of objectives, true cooperation from teachers in change efforts while paying constant attention to events in the field and being willing to carry out changes and adaptations.

- The arguments based on values, and at times even the hostility between different population sectors makes it hard to achieve consensus for a change program and certainly makes it hard to implement.
- Student violence and behavior problems, which exist in a significant portion of schools, undoubtedly make it difficult to apply programs such as academic dialogue or problem-based learning.
- There is the risk that the increasingly widening economic disparities will lead to a situation wherein even a successful though limited integration of a program to achieve equality of opportunity and improved achievement for all students will, at most, manage to close the gap and maintain the present conditions, but not bring about a real improvement.
- The differences between students in Israel are large and are evident in cultural diversity and the range of values, in the gaps in knowledge and inequality of opportunity. All these demand special attention when **preparing and implementing programs in the education field** in Israel.
- Most of the changes require great involvement on the part of teachers. Such involvement is certainly laudatory, desirable and even critical, but its attainment demands considerable investment of time and effort along with real collaboration, ongoing attention to events in the field and the willingness to carry out changes and modifications.

In addition to the various limitations of this report and the difficulties expected in implementing the recommendations, it should also be noted that the “shelf life” of the recommendations is not long. Empirical studies are published from time to time and they continually produce new knowledge. The experience from around the world and from Israel continues to accumulate and significant changes are occurring almost non-stop in the education system environment.

The research limitations we cited should be taken into consideration. Nonetheless, in our assessment, the information collected here can help policy makers in the field of education in Israel to identify the adaptations required of the education system today. We suggest examining the recommendations presented here together with the recommendations submitted by committees in the past, and to combine those that are adopted with the significant changes the Ministry of Education is currently planning and implementing.

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Appendices

appendix 5: Agenda of Symposium on "Pedagogy in the Information Age", Seminar Agenda

09:30 – 11:15	<p>First session: ICT Education Policy in Israel and around the World</p> <p>Chair: Prof. Anat Zohar, School of Education, Hebrew University of Jerusalem and the Mandel Leadership Institute</p>
09:30 – 09:40	<p>Prof. Menahem Yaari</p> <p>President (Emeritus), Israel Academy of Sciences and Humanities Chair, Steering Committee of the Initiative, Chair, Study Committee</p>
09:40 – 10:00	<p>MK Mr. Gideon Sa'ar, Minister of Education</p>
10:00 – 10:30	<p>Dr. Ofer Rimon, Director, Science and Technology Administration, Ministry of Education</p>
10:30 – 11:15	<p>Information Technology and the Transformation of Education (in English)</p> <p>Dr. Irwin Mark Jacobs, Chair, (U.S.) National Academy of Engineering, Founding CEO, Qualcomm, Inc; Education activist and former professor: MIT and UCSD</p>
11:15 – 12:15	<p>Second session: Technology in the Service of Teaching and the Start-up Nation</p> <p>Chair: Mr. Eli Hurvitz – Executive Director, The Trump Foundation</p> <p>With the participation of: CET, Snunit, Time to Know</p>
12:15 – 13:15	<p>Break: Light lunch will be served</p>
13:15 – 14:15	<p>Third session: (Title to be announced; to be given in English)</p> <p>Chair: Prof. Michal Beller, Director General, RAMA, Ministry of Education</p> <p>Prof. Andreas Schleicher, Educational Policy Advisor to the OECD Secretary-General</p>
14:15 – 15:00	<p>Fourth session: Under construction</p>
15:00 – 17:30	<p>Fifth session: Learning and Teaching in Digital Environments: An Academic View</p> <p>Chair: Prof. Sheizef Rafaeli, Director, School of Management, University of Haifa</p> <p>List of participants to be announced</p>
17:00 – 17:30	<p>Lecture title to be announced (Lecture will be given in English, via video-conference)</p> <p>Prof. Marshall (Mike) Smith, Visiting Professor at Harvard Graduate School of Education; former Under Secretary of the U.S. Dept. of Education</p>
17:30 – 18:00	<p>Summary and conclusion</p>

Appendix 6: Abstracts of the Scientific Literature Reviews Commissioned by the Committee

The reviews listed below were commissioned by the committee as background materials for its study and deliberation. Links are to summaries available in English

Integrating Content and Skills in Teaching History and Philosophy, Yehoshua Mathias

<http://education.academy.ac.il/Uploads/BackgroundMaterials/english/Review-eng-abstract-reorganizing-schools.pdf>

Integrating Content and Skills in Teaching and Learning the Natural Sciences According to the Israeli Curriculum, Sara Klein

<http://education.academy.ac.il/Uploads/BackgroundMaterials/english/Reivew-Eng-abstract-Integrating-Content.pdf>

Transfer, Learning Duration and IQWST, David Fortus

<http://education.academy.ac.il/Uploads/BackgroundMaterials/english/Organize%20school-review-science-fortus-eng.pdf>

Reorganizing Schools for the 21st Century, Maya Zuckerman

<http://education.academy.ac.il/Uploads/BackgroundMaterials/english/Review-eng-abstract-reorganizing-schools.pdf>

Review: Moral and Character Education in the Israeli Curriculum, Ariel Sarid

<http://education.academy.ac.il/Uploads/BackgroundMaterials/english/Reivew-Eng-abstract-21th-Moral.pdf>

Appendix 7: Brief Biographical Sketches of the Committee Members

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).

EMET Prize Laureate, 2012.

Member of the Initiative steering committee since its foundation, he now serves as its chair (since 2008).

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 perceptual 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, Professor in the School of Education at Tel Aviv University, where she heads the Program for Research, Measurement and Evaluation Methods. Previously, Prof. Nasser-Abu Alhija was research coordinator for GRE testing at the Educational Testing Service (ETS) in Princeton, NJ. Her research focuses on the methodology of measurement and evaluation of achievement as they relate to gender and culture, evaluation of teachers and teaching and, on the structural validity of testing methods.

Prof. Nasser-Abu Alhija holds a PhD degree in research, evaluation, measurement and statistical methods from the University of Georgia (US), received in 1997. Member of the Initiative's Steering Committee, and in the past – member of the Initiative's committees on 'measurement and evaluation in education', 'diagnosis, assessment and evaluation in early childhood education', 'knowledge base required for teaching secondary school mathematics' and 'schooling for the 21st century'.

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, Coordinator of the expert committee until December 2012.

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.

Emanuel Strauss, Coordinator of the expert committee, as of 2013.

Was previously with the Israel Land Administration where in his capacity as the head of the Administration Systems Analysis Division, he was involved in the initiation of innovations and changes in the organization and their implementation, in enhancing services to the citizen, preparing surveys, writing position papers and in formulating and streamlining work procedures. In parallel to his work, he wrote articles and jointly conducted various research studies, mostly under the auspices of Hebrew University of Jerusalem's School of Social Work. His academic work focused on different characteristics of social services and on streamlining their operation both at the organizational and clinical field work levels. He joined the Initiative in August 2012.

Dr. Strauss holds a PhD degree in social work, received from the Hebrew University in 1995.