Applied Education Research

From Research to Practice in Early Childhood Education

Executive Summary

Committee on Modes of Education for Ages 3-8

Pnina S. Klein and Yaacov B. Yablon, Editors

The Israel Academy of Sciences and Humanities
Jerusalem 2007

The Initiative for Applied Education Research
The Israel Academy of Sciences and Humanities The Ministry of Education
Yad Hanadiv (the Rothschild Foundation)

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Frontispiece:

Pablo Picasso: Claude Dessinant, Francoise et Paloma

Preface

The Israel Academy of Sciences and Humanities was founded in 1959. Its membership currently comprises ninety-four top Israeli scientists and scholars. According to the Israel Academy of Sciences and Humanities Law, 1961, its principal objectives are to bring together outstanding Israeli scholars; to foster and promote scientific activity; to advise the Government on research activities and scientific planning of national importance; to maintain ties with equivalent bodies abroad; to represent the Israeli scientific world in international institutes and conferences; and to publish articles that can further scholarship.

The Ministry of Education was founded in 1948, when Israel became an independent, sovereign state. Under the State Education Law, 1953, the Ministry is responsible for the education of Israeli children from preschool through high school, up to and including the twelfth grade. In addition, the Ministry is in charge of teacher-training in colleges of education. The Ministry deals both with pedagogical policy (e.g., development of curricula, teaching methods, and standards) and with organizational policy (e.g., budgeting for the education system, logistical planning, attention to special population groups, and inspection of educational institutions).

The Rothschild Foundation (Yad Hanadiv) is continuing the Rothschild family's philanthropic activity in Israel, which Baron Edmond de Rothschild began in the late nineteenth century. In the field of education, the Rothschild Foundation works on improving educational achievement, especially by increasing opportunities for all Israeli pupils to have a high-quality education. The Rothschild Foundation makes cutting-edge knowledge and expertise available to education workers, thereby spurring innovation, which can improve vital components of the Israeli education system.

The **Initiative for Applied Research in Education** was launched in 2003 as a joint venture of the **Israel Academy of Sciences and Humanities**, the **Ministry of Education** and the **Rothschild Foundation (Yad Hanadiv)**. The aim of the Initiative is to help improve educational achievement in Israel by developing the field of applied research. This field of research, based on scientific studies which were conducted in the past, as well as current theoretical and empirical development supports and helps work of decision-making in education.

The Initiative is based on the experience of the United States and Europe, where National Academies undertook to advance their educational systems through both theoretical and practical means. These regions have witnessed a marked improvement in student achievements, which can be under certain conditions, related to the systematic accumulation and intelligent use of knowledge and evidence.

Three working assumptions guided the establishment of the Initiative:

- New knowledge in various fields, from brain science to information management, may contribute to research and practice in education. In Israel there are research capabilities - in education and other fields - that can be encouraged to focus on improving educational achievement.
- Asking research questions derived by decision-makers' agenda may encourage education researchers, in collaboration with scholars in other fields, to expand the creation of knowledge that can benefit education practitioners. In an effort to answer these questions, new tools and theories may be developed for advancing the education system and education.
- Decision-makers in education, from teachers to the Education Ministry administration, will want to derive practical benefit from carefully reviewed and established knowledge that is made available to them and to contribute to the development of a growing body of knowledge based on their own professional experience.

Up-to-date information about the activities of the Initiative can be found on the Academy's Website: www.academy.ac.il.

Committee to review modes of education of preschool-age children and their relationship to deriving maximum benefit from school

In 1999/2000, Israel began implementing an amendment to the Compulsory Education Law, 1984, that extends free and compulsory education to all children aged 3-4. Implementation is being done gradually; within ten years it will encompass all children in this age group. Consequently, there is a need for an in-depth review and investigation of appropriate modes of education that will make possible maximum attainment of educational objectives. In addition, given the insight that success in the early stages of school is related to subsequent academic achievements, the Ministry of Education decided to examine second-graders' proficiency in the basic skills beginning in 2005/06. Against this backdrop, the Initiative for Applied Research in Education formed a committee of experts to review the empirical findings relating to various developmental and pedagogical aspects, in order to help the decision-makers in charge of the formal education of children in preschools (from age 3) and in the lower grades of elementary school.

The committee of experts, headed by Prof. Pnina Klein of the Bar-Ilan University School of Education, comprises leading scholars representing various academic disciplines whose knowledge the committee needed. What makes the committee unique is that its members were asked to reach agreement on each topic that they addressed. The committee met for the first time in February 2005, and for about two years it discussed key questions, summed up the present state of knowledge, and recommended course of action and new avenues of research.

Members of the committee

Prof. Pnina S. Klein (chair), Bar-Ilan University
Prof. Shoshana Blum-Kulka (emeritus), Hebrew University of Jerusalem
Dr. Tali Gorali Turel, State Teachers' College–Seminar Hakibbutzim
Prof. Avishai Henik, Ben-Gurion University of the Negev
Prof. Iris Levin, Tel Aviv University
Prof. Zemira Mevarech, Bar-Ilan University
Dr. Miriam Mevorach, Lewinsky College of Education
Prof. Avi Sagi-Schwartz, University of Haifa

Dr. Yaacov B. Yablon, Study Director

Foreword

The Israel Academy of Sciences and Humanities was founded in 1959, and in 1961 it was officially chartered when the Knesset enacted the **Israel Academy of Sciences and Humanities Law**. Among the missions of the Academy, as stipulated in its charter, are "the fostering of science and scientific activity" and "advising the government on matters of research activity and scientific planning of national importance." One of the main areas in which the Academy discharges these missions has to do with research in **Education**. The priority given to this field of research—and to the ways in which the findings of research in education are applied in practice—is a feature that the Israel Academy has in common with other leading Academies of Science in the West.

The Israel Academy of Sciences and Humanities is not itself a research institution and it does not conduct any research of its own. It carries out the aforementioned tasks through the establishment of expert committees or task forces, comprised of leading Israeli researchers and scientists, whose participation is on a volunteer basis. These experts examine the existing research, both in Israel and abroad, in the area of their assignment. They highlight the implications of this research for decisions being considered by policy makers or for questions that are the subject of public debate in Israel. Upon completion of their work, and after its fruits have undergone independent review, the committees' findings are made available to the general public in the form of official Academy Reports.

It is within this framework that the Academy's work on education research takes place. The **Initiative for Applied Research in Education** was established by the Academy in 2003, in consultation with the Minister of Education of the State of Israel. The prime mover in this initiative was Yad Hanadiv (the Rothschild Foundation) whose support of it continues unabated, both substantively and financially. Under the Initiative, several committees of experts have been formed, each of which charged with exploring one of the major issues arising in Israel's educational arena. The present document, **"From Research to Practice in Early Childhood Education"**, encapsulates the work of one of the committees of experts convened by the Initiative. In the course of the committee's work, it has consulted with several senior officials of the Education Ministry who are in charge of planning and overseeing the education of children aged 3–8. It is now our hope that this document, its findings, conclusions, and recommendations, will be of value to

these individuals and to other policy makers, that it will serve the scholarly community at large, and that it will stimulate public debate on the important questions arising in connection with the education of the very young in Israel.

This Report will probably give rise to comment and criticism and hopefully to constructive and professional discussion that will pave the way to improved practice and enhanced research, and may this be our reward.

Menahem Yaari
President

Acknowledgments

In the course of their discussions, the committee members consulted with experts in various related fields. The committee is grateful to Prof. Dorit Ravid of the Tel Aviv University School of Education for her contributions on the subject of reading. Special thanks go to Dr. Reut Yamin for her professional contribution to the survey of the scholarly literature on reading and for advising the committee until the written product was complete. The committee also thanks Dr. Michal Unger, Shira Dvir, Moran Vaknin, Desiree Melloul, and Varda Meller for their help in gathering the data and presenting the research findings on the various subjects, as well as Gavriel Melloul for his original illustrations in the chapter "The Development of Self-Regulation: Nature and Nurture."

The heads of the departments of Pre-School Education and Elementary School Education in the Ministry of Education helped the committee get started by presenting key questions facing senior ministry officials in charge of the education of children aged 3–8. The committee is grateful to Dr. Ilana Zeiler, director of Educational Institutions Department A and acting director of the Department of Pre-School Education, for her involvement in outlining how the committee should work and Sarah Reuter, director of the Department of Elementary School Education, for sharing knowledge gained from the experience of educators.

We thank the steering committee of the Initiative for Applied Research in Education for the opportunity that the formation of the expert committee on early childhood gave us and for its valuable assistance all along the way, until the job was finished.

Special thanks go to Prof. Michael J. Feuer, director of the Division on Behavioral and Social Sciences and Education at the National Research Council (part of the National Academies in the United States), for generously sharing with us some of what the NRC has learned from its experience and for developing cooperative ties with leading scholars around the world.

We are grateful to the staff of the Israel Academy of Sciences and Humanities for the positive atmosphere and assistance that we enjoyed throughout. We are also grateful to the Rothschild Foundation for its constructive criticism, constant support, and splendid, friendly help.

Special thanks go to Kari Druck, the copyeditor and scientific editor, for her skillful work (including a critical reading of every chapter) and broad judgment, which ultimately enabled us to produce this volume.

Special thanks go to Riki Fishel and Etty Amit, members of the staff of the Initiative for Applied Research in Education, for their assistance and their support for the committee's work.

Peer review

The present document, which sums up the committee's work, was sent for peer review to experts from Israel and abroad so as to obtain critical, objective, external feedback and to help the committee members draw up as good a report as possible. To ensure objectivity, the referees' identity was withheld from the committee members until publication of the report.

We would like to thank the referees for their reading of report and for offering their meaningful insights:

Prof. Bat-Sheva Eylon, Department of Science Teaching, Weizmann Institute of Science

Prof. (Emeritus) Charles Greenbaum, School of Education, The Hebrew University of Jerusalem

Ms. Ruchama Katsir, former director of the Central District, Ministry of Education

Prof. Jeremy Kilpatrick, Department of Mathematics and Science Education, University of Georgia

Prof. Catherine E. Snow, School of Education, Harvard University

Prof. (Emeritus) Shlomo Vinner, Ben-Gurion University of the Negev

Prof. Philip D. Zelazo, Department of Psychology, University of Toronto

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations, nor did they see the final draft of the report before its release. Responsibility for the final content of this report rests entirely with the members of the committee

Pnina S. Klein, chair Yaacov B. Yablon, study director

Contents of the Hebrew prepublication version:

*Andrea Berger, Motti Gini, Sharona T. Levy, Esther Adi-Japha, Ora Kofman, and Rachel Schiff served as consultants and not members of the committee

Contents of the Executive Summary:

From Research to Practice in Early Childhood Education

Executive Summary

Excerpts for Policymakers*

The committee report represents a balance between different theoretical trends and educational approaches. The recommendations are based on research that facilitates identifying specific factors that contribute to child development and to the effectiveness of a teaching and learning process for young children.

It should be stressed that the committee functioned as a consensus committee; i.e., all decisions and recommendations were unanimous. The recommendations reflect a consensus based on research

Although some of the recommendations may seem self-evident, they are included among the committee recommendations for two reasons: (1) the state of affairs in early childhood education in Israel reflects problems in these areas (e.g., teacher-child relations); (2) recent studies stress the importance of these recommendations.

Relying on research findings from Israel and abroad, the committee members decided to issue detailed recommendations concerning various aspects of education. These recommendations are meant for professionals and researchers who work in education and are described in detail below. To help decision-makers on the administrative level, a summary of the recommendations is presented in the following box:

Summary of main conclusions with regard to policymaking:

1. **Class size and the adult-child ratio:** In order to enable children to develop in an environment that is supportive of learning, the committee recommends having 14–16 children in a class of three- to four-year-olds, 16–20 in a class of five- to six-year-olds and no more than 25 children in a first-grade class. To maintain an appropriate adult-child ratio in each age group, it is recommended that a teacher and a teacher's aide be assigned to every class, so that the educational staff can get to know the personal traits of all the children, display sensitivity, and meet their individual needs.

* This summary is a translation of the Hebrew summary. There may be slight deviations from the original text.

2. **Teacher-pupil interaction:** It is important to ensure the quality of teacher-pupil interaction in terms of social/emotional factors and the teaching process. Teachers and other faculty members must therefore be trained to have quality interaction with the children and to identify, evaluate, and improve the components of the interaction.

3. **Training the educational staff:** Only professionals with suitable academic training should work with young children. Their training should include acquiring up-to-date knowledge in the field of child development and in the subject they are going to teach. It is recommended that candidates for teaching jobs undergo meticulous screening in terms of their personal suitability for the job as well.

4. **Cultivating competencies:** It is recommended that laying the foundations for literacy (in Hebrew or Arabic) and numeracy begin in preschool; formal instruction in these subjects should take place in school. In addition, it is important to cultivate spoken language competencies in a wide range of types of discourse. One should provide activities in the various arts, making sure to lay suitable foundations.

5. **Children at developmental-environmental risk, children with special needs, and children with special competencies and high motivation:** Children at developmental-environmental risk and highly motivated children with special competencies should be identified as early as possible and educational programs tailored to them. In its discussions, the committee did not focus on children with developmental delays, learning disabilities, or special competencies and high motivation. Nevertheless, it is unanimously agreed that the development path of young children can be changed and improved by effective educational programs that increase the likelihood of optimum development by reducing risk factors and increasing protective factors.

6. **Educational research:** There is a shortage of basic and applied educational research on early childhood. Countrywide studies should be planned in order to examine the differential short- and long-term effects of various educational settings for early childhood, curricula, and intervention programs in preschools. Databases should be created, research and development on early childhood should be promoted, and the foundations should be laid for follow-up research, such as a cohort study from childhood to adulthood.

Summary, Findings, and Conclusions

A. BACKGROUND

Many studies of children's physical, social/emotional, and cognitive development have addressed questions regarding the improvement of preschool education and its relationship to development, adaptation, and learning in primary school. There is no doubt that efforts to improve children's learning in school require attention to the care and education they receive in early childhood. In 1999/2000, Israel began implementing an amendment to the Compulsory Education Law (1984) mandating free preschool education for all three- and four-year-olds, with the goal of including all children in this age group over a period of ten years. Implementation of this amendment will require comprehensive research about the modes of education that can best achieve these objectives.

Against this background, the Initiative for Applied Research in Education formed a committee of experts to review the findings of empirical studies about various aspects of development and pedagogy, in the hope of assisting the decision-makers responsible for the formal education of children in preschools (from age 3) and in the lower elementary grades. When it convened for the first time, in 2005, this committee defined its role as follows:

1. To survey, evaluate, and summarize all aspects of research findings on child development, especially those that may contribute to a better understanding of modes of education, educational processes, and other variables related to childcare for preschool children, and their association with children's optimal development and success in school during the first years of formal primary education;
2. To reach agreement on the elements that are essential for children's development and to point out their implications for preschool education, including childcare, curricula, and teacher-training;
3. To identify research questions and areas where further study could benefit decision-makers;
4. To submit a written summary of the committee's conclusions for the use of policymakers and decision-makers.

The committee's discussions focused on issues that impact on the education and development of young children, the experience of attending and learning in preschool, and how these relate to learning in primary school. Drawing on recent studies, the committee concluded that the following processes are essential for the optimal development of preschool children: (1) encouraging their emotional and social adaptation, (2) developing language and preliteracy skills, (3) fostering openness to learning and inventiveness.

Contemporary scholars and educators are divided about the best method of preschool education and teaching. Some emphasize the importance of focused and structured education; others prefer modes of instruction that permit free activity at the child's own initiative. The committee opted for an intelligent combination of the different approaches, aimed at affording preschool children many diverse opportunities to develop and learn, including free activity (both play and non-play), incidental and unstructured learning supported by the educational staff in response to children's own initiatives, and planned and structured teaching.

Following a series of discussions, the committee reached general agreement about its main conclusions. The conclusions indicate a need for a change of emphases in the educational process. As noted, the proposed changes draw on the findings of up-to-date research that highlights the importance of social/emotional and educational interactions between teachers and children and among children, the cultivation of cognitive and language skills, and the development of openness to learning and creativity. The committee accords special value to ensuring a positive emotional atmosphere and avoiding all manifestations of violence in educational settings. Its members also agree that there is a need to focus on the quality of communication between adults and children and among children, in order to enhance all aspects of spoken language. Preschoolers should be helped to develop basic verbal and mathematical literacy, including phonological awareness and knowledge of the alphabet and numbers, and should be exposed to books.

The committee would like to recommend a process that would make it possible to verify that children of preschool age enjoy the basic conditions needed for their optimal development, notably interaction with adults who express positive feelings toward the children and responsiveness to their needs, along with opportunities for attentive quality dialogues with others, superior educational practices, and the correct balance between structured and unstructured teaching.

The committee proposes relating to preschool education with the awareness that the potential for deriving maximum benefit from formal schooling depends on an early educational environment that includes several fundamental elements. The first element is positive relations with the children, which lead to basic confidence and encourage them to investigate their environment and learn from it. The second is quality teaching behavior and a rich dialogue with the children. The third is enhancement of learning language, literacy, arithmetic, and the arts, incorporating incidental learning and structured instruction.

In view of these conclusions, any attempt to improve the education provided to young children must address the need for a substantial reduction in class size. State-supported preschools in Israel currently average 31 children (2003/04 data) per classroom. This situation does not permit optimal conditions for development, learning, and quality interactions with the children.

As stated, the committee's summaries and conclusions refer to educational activities in preschools and primary schools. In addition to the subject- and content-based aspects of various domains of knowledge and skills (such as language, verbal literacy, mathematical literacy, and the arts), the committee endeavored to include in its discussions process variables (such as the quality of adult-child social-emotional and teaching interactions) and structural and environmental variables (such as the model of the educational setting, class size, the adult-child ratio, and the duration of the school day and week).

The committee is aware that environmental conditions, family, community, and culture may play a major, distinctive role in children's development and learning. In keeping with the committee's mandate, its conclusions do not directly address factors outside the preschool and school; nevertheless, we recommend that they be implemented with as much sensitivity as possible to the preschoolers' familial, linguistic, cultural, and community contexts, and that the material studied be adapted to the needs of the different children. For instance, although the committee did not conduct a thorough examination of studies of children from different population groups (e.g., ethnic minorities and immigrants), its members believe that children's mother tongues should be preserved and that all children and educators should be made aware of and encouraged to display tolerance for multilingualism and multiculturalism.

In this context, we especially note the importance of the family and its role in child development and in helping children take full advantage of the educational setting for their personal advancement. The committee recommends paying serious attention to the imperative of building productive, two-way interactions between teachers and parents, for the sake of achieving a better understanding of each child's needs and tailoring teaching and learning processes to these needs and to the parents' educational goals.

The committee recognizes the importance of children's motor development and the possible implications of variables related to motor development for children's behavior and achievement in preschool and school. However, this subject was not a focus of the committee's discussions.

The committee's discussions of science education were based on the studies presented in the appendix. Chiefly because of the absence of a research basis permitting informed judgment, no firm conclusions could be drawn about preschool science education. Nevertheless, several items in the conclusions below do relate to the cultivation of scientific thinking. Among other things, it is suggested that children be exposed to interesting experiences that stimulate their curiosity and that they be encouraged to take part in dialogue, to ask questions and investigate, to observe and describe phenomena, to investigate things carefully, to pursue information, and to provide explanations. All of these, especially when accompanied by high-quality mediation by an adult, have the potential to develop children's awareness of research strategies and to cultivate scientific thinking that requires defining a problem, investigating it, and identifying possible solutions cautiously, systematically, and patiently.

Any attempt to ground quality teaching must also relate to the goals of education. Although this issue is addressed in various subsections of the report, the committee did not directly address the various definitions of the goals of education in the contexts of culture, status, and so on. We believe that these issues must be considered in every educational setting for early childhood.

Finally, children with special needs—such as those with developmental and or learning disabilities, as well as the gifted—require curricula tailored to their needs. The committee did not discuss such special curricula. Nevertheless, we emphasize the importance of paying attention to the various population groups mentioned above and to the need for early assessment of their special needs and difficulties, so that they, too, can experience optimal development in the educational system.

Before presenting the committee's recommendations, we would like to stress that the research on which they are based is reviewed in detail in the various chapters of the report. Furthermore, these chapters naturally expand the discussion of each of the topics mentioned here. Finally, although most of the recommendations relate to teachers and their activities, they also address all adults who work with children.

B. THE DEVELOPMENT OF PRESCHOOL CHILDREN: PRELIMINARY ASSUMPTIONS

The committee adopted the following basic assumptions made by a committee of the United States National Academy of Sciences[1] as its starting point regarding the development of preschool children:

1. Human development is shaped by active, ongoing interactions between biological factors and environmental factors.
2. Culture, in all its facets, influences human development and is reflected in beliefs about child-rearing and the practices followed to promote children's well-being and adaptation.
3. The development of self-regulation is one of the fundamental elements in the development of preschool children and affects all areas of their behavior.
4. Children are active participants in their own development, reflecting the innate human drive to explore and control one's environment.
5. Human relationships, and especially the effects of early relationships on later ones, constitute the building blocks of children's development.
6. Individual differences among children frequently make it difficult to distinguish among developmental variations and delays that lie within the normal range, temporary developmental disturbances, and irreversible defects.
7. Children's development follows individual paths that are characterized by both continuity and discontinuity and include significant transitions.
8. Human development is shaped by the continuing interaction between sources of vulnerability and sources of adaptability.

1. J. P. Shonkoff and D. A. Phillips, *From Neurons to Neighborhoods: The Science of Early Childhood Development* (Washington, DC: National Academy Press, 2000).

9. The timing of every early-childhood experience may affect development, but children are generally vulnerable to risks and open to protective effects from their very first years until adulthood.

10. The early-childhood development path can be changed through effective intervention that creates a balance between risk factors and protective factors and increases the prospects for optimal development.

C. EFFECTS ON DEVELOPMENT AND LEARNING

1. Social/emotional relationships

There is a consensus in the research literature about the importance of children's earliest emotional and social interactions in shaping their self-perception as human beings and as pupils and as the basis for their social interactions in the future. These interactions also affect children's cognitive skills and their prospects for educational achievements in school. Research suggests the existence of a developmental continuum that includes the creation of social-emotional security cycles that serve as the basis for all aspects of children's social and academic performance. Consequently, there is a need to attend to children's social-emotional development during their preschool years, in addition to focusing on cognitive and educational matters.

Recommendations: The social/emotional climate of educational settings

The recommendations concerning social/emotional relations appear obvious, but they deserve emphasis given the present situation in Israeli preschools and first- and second-grade classes, and in view of recent research findings that demonstrate the importance of teacher-child relations and their impact on children's potential for learning:

(A). Building a positive social/emotional climate

1. Relations between teachers and educational staff, on the one hand, and children, on the other, should display sensitivity and understanding of the latter's needs. Relations marked by sensitivity and responsiveness help children perceive the teacher as a secure emotional base and allow them to direct their intellectual resources to inquiry and learning. To achieve this objective, the educational staff must recognize and understand children's individual traits and respond to the specific educational and emotional needs of each and every child.

2. Prosocial behavior should be encouraged in the interactions among children in preschool and primary school.
3. The behavior of the educational staff must be positive, consistent, and confident and serve as a model for pupils in every sphere of activity.
4. In order to encourage fruitful cooperation with parents and flexibility in the educational process, parents' and educators' short-term and long-term educational goals should be clarified, along with the extent to which they coincide with what is actually accomplished.

(B). Avoiding a negative social/emotional climate

Teachers should serve as a model for regulating emotions, including:

1. Setting clear behavioral limits and making sure that they are adhered to;
2. Preventing inappropriate manifestations of anger and aggression by educational staff and pupils, unequivocally and without compromise;
3. Assessing the nature of any worrisome signs that appear in the behavior of children or teachers and applying appropriate intervention strategies.

2. Didactics and the quality of teaching

All children need a sensitive environment that offers a suitable response to their needs and signs of communication, so that they can develop the emotional, social, and cognitive abilities that make it possible for them to learn. The teaching staff, educational methods, and quality of instruction are important elements of this environment.

Recommendations: Didactics and the quality of teaching

1. Alongside an assessment of the quality of the social/emotional relationship between teacher and pupils, the quality of the teaching interaction must also be assessed.
2. There must be expressions of emotion toward children as well as toward the subject matter studied (including persons, objects, processes, and events). Such expressions (e.g., of enthusiasm in relation to the topic studied) are critical for the immediate and future learning processes and help convey the meaning of the subject being taught.
3. As part of the teaching process, educators should help children focus on learning in order to extract meaning from their experiences and relate them to their other experiences in the past, present, and future.

4. As part of the teaching process, adults should expand children's immediate learning experiences (for example, by means of conceptualization, generalization, analogies, and cause-and-effect relations). It is suggested that children be guided to make use of the diverse possibilities available for searching for information (asking different people, consulting books, using computers, etc.).

5. In order to progress, children need an environment that challenges them at a level of difficulty appropriate to their abilities, such that they can deal with it if supported by the teacher.

6. Children need positive feedback and encouragement from parents and teachers. Encouragement should be focused and detailed and should make it clear precisely what the children did well and what led to their success.

7. Evaluation of the quality of the educational interaction and each child's progress should be a regular part of the learning process.

8. Continual systematic collection of information about children's daily functioning in preschool and primary school, along with a description and interpretation of this information, is an effective means of planning the teaching process, adapting it to children's needs, and maintaining meaningful communication with parents and the teaching staff.

9. There should be follow-up and evaluation of teachers' performance and their contact with their pupils so as to facilitate constant improvement of the quality of instruction by means of professional guidance and mentoring.

10. Various research tools, including observations, must be used to evaluate the teaching process experienced by each preschool child.

11. It is recommended that periodic workshops to promote the professional development of teachers and members of the educational staff be held throughout the school year, alongside their day-to-day work, in preparation for the recurring assessment of pupils' performance, the quality of the educational environment, and the extent to which the environment responds to the pupils' needs.

12. Intervention programs that allow children and parents to visit the school and get acquainted with it before the start of the school year are recommended.

3. The selection and training of preschool educators

Teachers' personalities, professional abilities, and level of training have a significant impact on the implementation of educational programs, the quality of care given to preschool children, and the children's development. Research has shown that the presence of a teacher with a teaching certificate and an academic degree in early-childhood education significantly enhances educational outcomes. For example, children's achievements in reading and mathematics are higher if their teachers have taken specific training courses for teaching these subjects. The selection of teachers must relate to various factors, including educational expertise, language skills, cultural awareness, and emotional understanding, as well as personality and mental-health variables. For example, persons with depressive tendencies should be excluded.

To help children progress in various fields of knowledge and to improve the quality of the social/emotional relations between teachers and children, as well as teachers' teaching interaction with children, (1) teachers must be familiar with the normal developmental sequences of children in various domains and be able to assess their abilities as a function of their level of development; (2) teachers must be acquainted with a variety of teaching methods and curricula in different areas; and (3) teachers must be aware of the individual, developmental, cultural, and social diversity among children.

Recommendations: Selection and training of preschool educators

1. Educators of young children (ages 3 to 8 years) should be trained in academic institutions that specialize in early-childhood development and education.
2. Working with children requires social/emotional fitness and the ability to interact positively with children. Institutions that train early-childhood educators should incorporate these factors into their admissions and graduation criteria and screen out candidates who lack them.
3. As part of their training, teachers should learn appropriate instructional methods and approaches.
4. Programs for training early-childhood and preschool teachers should prepare them to work in multicultural classes. These programs should include information about the home culture, variations among children in relation to interpersonal and intergroup differences, and educational approaches for dealing with heterogeneous groups of pupils.

4. Incidental learning and structured learning

Planning lessons for preschoolers includes an intelligent combination of activities initiated by the children and learning directed by the teacher. It is important for teachers to permit all children to initiate activities, express ideas, and react to these initiatives and ideas at the proper time and in an appropriate manner. Accordingly, early-childhood education must strike a balance of diverse experiences along the continuum between random, unstructured learning and deliberate, structured learning.

Daily events that take place naturally in a child's life should be exploited to promote the development and learning process. At the same time, teachers have to set specific objectives and plan their work in a systematic fashion. Their plans should be based on familiarity with the subject matter being taught, the nature of children's developmental process, and an awareness of children's individual interests and abilities.

Recommendations: Incidental learning and structured learning

1. Emphasis should be placed on a developmentally appropriate combination of free play and learning activities initiated by the children, on the one hand, and activities directed and structured by the teacher, on the other.
2. Advanced teaching methods for the provision of information should be integrated with teaching styles that stimulate the children to act and encourage them to explore, create, and search for information by themselves.
3. Familiarity with and an understanding of the stages of child development, in all aspects of teaching and learning, at all times, and in every situation, should form the basis for all activities of the teachers and other educational staff.

5. Language: Conversing, Reading, and Writing

Language is one of the fundamental building blocks of human social life. Teaching correct and effective use of spoken and written language is one of the goals of education in general and of early education in particular. Because language and its use have both short-term and long-term implications, children must acquire basic mastery of language early in life.

Children acquire language by taking part in meaningful conversations during communication with adults and other children. Nevertheless, there is great cultural, social, and individual variation in the nature and quality of

communication with adults. In practice, the communication style of adults—both parents and teachers—has far-reaching effects on children's acquisition of language and verbal literacy; the quality of the communication between teachers and children in preschool and primary school has a decisive impact on language development. Successful verbal mediation in an educational setting can compensate for any linguistic deficits of parents and family. As noted, rich communication experiences with other children may also make an important and special contribution to the development of language skills.

The successful development of language and literacy includes the development of the complex textual and linguistic skills of literate dialogue. Well-developed literate dialogue draws on a rich vocabulary and employs complex morphological, syntactic, and textual structures. It can be expected to manifest itself in every context, but especially with regard to remote topics and complicated texts. Literate dialogue skills permit conversing, reading, and writing about familiar topics and issues as well as about those that are removed from the here and now, extracting meaning from structurally and linguistically complex texts, and expressing oneself clearly and precisely. A good command of the skills of literate dialogue makes it possible to read, understand, and express orally or in writing complex texts that preserve an appropriate register, cohesiveness, and level of detail and clarity appropriate to listeners and readers.

Recommendations: Teaching language and extended-discourse competencies

1. The educational staff of preschools and schools should create opportunities to develop oral communication with the children and among the children themselves and to make it more sophisticated. Literate oral communication should be enhanced by dialogue between the educational staff and the children. The staff should be alert to opportunities for developing literate discourse among children through the intelligent use of language that is rich, complex, diverse, and thought-provoking, and should encourage discussions of familiar topics as well as those that are remote from immediate experience. All this should be done in meaningful class, group, and individual encounters.

2. In addition to deliberate intervention to promote literate conversation, there should be opportunities for free play and conversation without intervention. The play should be observed as a means of understanding the children's world and planning future activities. The staff should ensure an appropriate balance between time devoted to purposeful pedagogic intervention (one-on-one conversations, group discussions, and

direct instruction) and periods when they intentionally refrain from intervening (for example, during free play) and allow for the development of interactions among the children themselves.

3. The educational staff should develop the children's level of literate discourse by means of planned activities such as the following:

   (a) Creating an educational and literate environment in the preschool and primary school that supports diverse experiences designed to enrich vocabulary and grammatical and discourse structures, including diverse types of discourse (stories, poems, and expository texts on various subjects) and various types of symbolic systems (books, pictures, maps, signs, and the like).

   (b) Organizing activities to familiarize children with diverse forms of literate written discourse, symbolic systems, and formats—for example, story books, poetry books, cookbooks, science books, and signs and symbols of various sorts. To enrich children's general and linguistic knowledge, it is important to conduct meaningful discussions that relate to the content world and the genre of the texts, in small groups or with the entire class.

   (c) Organizing activities to encourage continuous, oral, literate discourse in various genres, such as retelling a familiar story, acting out a personal story, delivering a report on a scientific topic that interests the children, conveying the rules for a game, or developing an argument in oral debate. In preschool and the primary grades these activities should be accompanied by writing for fun or by planned activities (making a sign, drawing up a shopping list, etc.).

   (d) The educational staff of preschools and primary schools should help foster the children's conversational skills and relate, among other things, to taking turns, listening patiently to others, and answering them in a pertinent and informative manner, in the appropriate register. Conversation will be cultivated by allotting time for conversations among friends and individual conversations with children, and by encouraging challenging discussions in small groups or with the entire class that focus on a topic, problem, joint project, or text.

Recommendations: Providing initial competencies for literacy and introduction to reading and writing

Fluency in reading is essential for normal integration into a literate society. Reading is a complex capability that is generally acquired through explicit teaching and is therefore learned at school. Learning to read presupposes knowledge of the language, but it also depends on mastery of alphabet skills—knowing the names and shapes of the letters and their phonetic values. Teaching these skills in preschool, as part of the initial exposure to reading and writing, can lay the foundation for learning to read in school. It is therefore very important to teach the basic skills in preschool and reading itself in primary school in effective and appropriate ways.

1. Nurturing literacy among preschoolers aged 3 to 6 should focus on three elements:

   (a) Developing linguistic competency. The educational staff of the preschool should focus on enriching the children's language, lexically, morphologically, and syntactically, by using rich, challenging language when communicating with the children on any subject and exposing them to texts of many kinds. Children should acquire conversational skills at a level appropriate to their chronological age and individual capacity. They should be able to express themselves orally—conversing on various subjects for various purposes—and should understand what they hear in a range of genres: having a conversation, listening to a story, or listening to an informative text.

   (b) Teaching alphabet-related skills and the prerequisites for reading and writing, while motivating the children to want to be literate. It is not recommended that formal instruction in reading begin in preschool. However, efforts should be made to ensure that children understand the alphabetic principle, are sensitive and aware of language and its sounds, and know the names, shapes, and phonetic values of the letters. Children should develop the prerequisites for reading and writing and understand the uses of writing. They should want to learn to read and write and to use written language.

   (c) An orientation to books. Children should become familiar with children's literature and the language of books, learn the rules and conventions of reading and writing (for example, the direction of reading), and display an interest in stories and a desire to listen to them.

2. In cooperation with the children, an environment should be created in the preschool that encourages active and meaningful use of writing and the written language, promotes literate activity, and gives expression to what is taking place in the preschool. This environment may include books, letter strips, word signs, writing paper, and writing implements. In addition, it is suggested that regular use be made of specialized software and technology, such as computers that support writing or games and television sets for watching educational programs.

3. It is suggested that every preschool have an active library and a lending library. The library should contain enough books to support regular activities in the preschool as well to allow every child to choose a book to take home at least once a week for the entire duration of his or her preschool career, without affecting the activities in the preschool. The library should include books of various types—knowledge-enhancing books such as encyclopedias, dictionaries, science books, and art books, as well as children's literature and poetry, fairy tales and folktales, Bible tales and rabbinic legends. The library should include several copies of certain books so that a group of children can look at them together.

6. Writing Competencies

Writing competencies include several skills—letter formation, spelling, and higher cognitive skills associated with discrimination, organization, and written expression of thoughts and ideas. Fluent and skilled writing requires mastery of all these skills. In many countries, including the United States, England, and Australia, there is a single prevalent method for teaching writing to young children, which combines handwriting skills, spelling, and basic literacy competencies. In Israel, by contrast, there is no single method used to teach writing.

Recommendations: Cultivating writing competencies

1. Preschool children should be encouraged to express themselves in different ways, including writing, depending on their capacity, but formal teaching and practice is not recommended in preschools. Nevertheless, an opportunity should be afforded for children to show an interest in writing and to study its graphophonemic aspect (the relationship between letters and sounds) and its communicative aspect.

2. "Prewriting" is an activity that helps children progress towards learning to write and is part of the developmental process. Prewriting is generally done as drawings and includes writing-like scribbles, random letters, and

partial phonetic writing. Children should be permitted to write in this fashion at the level they can manage and should be encouraged to advance toward regular writing, consonant with their level of development, only if they are ready for it.

3. Children who have trouble with graphic activities should be given frequent opportunities to draw and engage in prewriting, using diverse means appropriate to them, such as doodling with their fingers on sand boards, arranging plastic letters, and using computer keyboards.

4. Children should be taught the shapes of letters, the letter-sound relationship, and the communicative nature of writing, at a developmentally appropriate level.

5. It is important for children to understand the main functions of writing, such as preserving and documenting oral language. Efforts should be made to document in writing things that children say orally. Documentation of oral language can provide children with additional exposure to the linguistic principles of the written language, whether Hebrew or Arabic. This can be done, for example, by writing down stories the children tell or transcribing classroom discussions, assembling them as a book, and reading them back to the children.

6. In the early stages of writing instruction, attention should also be paid to the graphomotor elements of writing, such as the pencil grip.

7. Mathematical Literacy

Mathematics plays an integral part in the activities of young children. They compare quantities, make models, measure objects, build with blocks, and so on. These activities contribute to the development of mathematical thinking, which is the basis for later study of mathematics and science.

Children develop a variety of mathematical abilities from the time they are two years old, and maybe even earlier. At this age, the core of mathematical knowledge is informal. It is acquired through incidental, unplanned activities—at home, in the park, in the shopping mall, in the supermarket, and in the family car. This knowledge forms the basis for the development of mathematical literacy. Formal mathematical knowledge is acquired later—in preschool and primary school. Formal knowledge includes all the topics and concepts associated with mathematics and is learned through deliberate effort.

Mathematical literacy is the ability to identify, understand, and deal with mathematical problems and to evaluate the role of mathematics in individual and social life and in science. Accordingly, for young children mathematical literacy is not limited to making computations and reciting the numbers in the correct order; it also includes the application of mathematical knowledge and skills in daily life, the inclination to employ mathematical thinking in a broad range of situations, and the cultivation of mathematical insight.

Recommendations: Teaching mathematical literacy

The following recommendations are based on the most recent trend in mathematical education, which emphasizes "big ideas" (understanding mathematical processes, making calculations, applying mathematical models in various situations, and engaging in mathematical communication):

1. The development of mathematical literacy should begin in preschool and perhaps even earlier, on the basis of knowledge and skills that children acquire naturally. The development of mathematical literacy at preschool age should be age-appropriate and should focus on the following four components:

   (a) Understanding "big ideas," such as the number concept, including cardinal numbers and ordinal numbers; understanding basic quantitative concepts such as size, quantity, and order; identifying the digits; understanding the number system and the relationships between numbers; developing number sense; becoming familiar with and understanding two- and three-dimensional shapes and various models of number representation and increase and decrease;

   (b) Understanding mathematical processes, such as computation and thinking; knowledge of mathematical facts and familiarity with mathematical rules; and flexibility in understanding mathematical processes;

   (c) Developing the ability to apply mathematical models in various situations, including identification of situations that require mathematical judgment, a desire to use numbers and make calculations, and a basic orientation in the world of numbers;

   (d) Developing mathematical and metacognitive discourse, including mathematical communication, and becoming able to report on the strategies used for problem-solving, checking, guiding, and reflection;

2. The teaching of mathematics to young children should employ metacognitive methods that require children to explain and justify the mathematical thinking they used to solve the problem.
3. A play area and library containing mathematical games and books should be set up in preschools.
4. Various teaching aids should be employed for building mathematical models and solving problems. For instance, children should use computers with adult assistance.
5. Mathematical concepts and mathematical thinking should be taught in the course of everyday preschool life, integrating mathematical concepts, processes, and content in various activities or in the children's daily experiences.
6. Standards should be developed for teaching mathematics to young children, including the following elements: the number system and arithmetical operations, algebra, geometry, measurement, data analysis, and probability. In each of these areas, the following abilities should be cultivated and developed: problem-solving, explanation and proof, linkage, communication, and representation.
7. The training of preschool teachers should include mathematical instruction in early childhood and should emphasize the development of mathematical thinking at this age.

8. The Arts

The status and function of arts education for young children is a controversial subject. The various approaches are based on two distinct philosophical and educational approaches: according to one of them, the arts are an essential domain of humanistic knowledge that is valuable in and of itself ("art for art's sake"); according to the other, the arts are a practical tool that supports cognitive development and learning in non-arts domains ("art for people's sake").

The most recent research in the arts, education, psychology, and neuroscience on the artistic activity of young children highlights the relationship between children's involvement in the arts and arts curricula and their comprehension of the arts, suggesting that artistic activity promotes children's motor, emotional, and social development. To the question 'What do the arts teach children?' the researchers reply that they enhance creative thinking; develop originality, focused perception, and imagination; and

reinforce the desire to study what is vague, the capacity to identify multiple perspectives, and the understanding that they can coexist.

As mentioned earlier, the goals of education have a significant impact on arts education. The research literature lists many goals, including providing pupils with an opportunity for self-expression, enjoyment, and creation; strengthening motor, auditory and aesthetic/artistic development; making their thinking more sophisticated; fostering a sense of connectedness and belonging to their culture; and developing social skills.

Recommendations: Arts education—plastic arts, music, and movement

1. Areas with appropriate materials and equipment should be set up in preschools as centers for artistic activity in various media that enable children to develop in an atmosphere that encourages self-expression.
2. An optimal acoustic environment should be created in preschools, taking account of human behavior and the layout of the facility.
3. A continuing dialogue on the arts should be encouraged between the educational staff and the children and among the children themselves, expressing fundamental concepts and principles such as shape, color, timbre, melody, and composition.
4. In addition to the artistic activities directed by the preschool teacher, the educational staff should be attentive to the children's interests, relating to their initiatives and encouraging them to realize them.
5. Music can be used to develop language skills, such as morphology, phonology, and vocabulary, by emphasizing focused listening, rhymes, and repeating patterns; it can also be used to improve rote learning and memory.
6. Intelligent and sensitive use can be made of music to relax and soothe when necessary.
7. Exposure to a creative environment, creative programs, and creative teaching should be integrated to develop an artistic perspective and improve the children's work in the arts.

9. Structural Aspects

The structural aspects of educational settings may have significant effects on children's development, achievements, and social skills. It is important to define clear criteria regarding the ecological and educational

environment of educational settings, the professional level of the administration, and the caliber and professional level of the staff, and to assure that these criteria are actually satisfied. In this context the following factors should be considered: (a) class size and staff-pupil ratio; (b) length of the school day and school week; (c) the organizational structure of the preschool.

1. Class size and staff-pupil ratio

Various studies indicate that the number of children in a preschool class for children younger than three affects their development. In order for children to have quality interactions with the teacher and receive meaningful instruction, the ratio between children and adults must permit sensitive, individual attention to every child, with the teaching adapted to each child's abilities and needs. This is particularly important in preschool and first grade, when children enter a new institutional setting and begin the formal study of fundamental skills. In this context we should note that in the Western world the average class size in the first and second grades does not exceed 25.

Most studies refer to two structural criteria: the ratio of adults to children in each class and the number of pupils in a class. It is difficult to determine the optimal ratio of adults to children in a learning group because of variability in the traits of the children and of the adults who work in educational settings for children above the age of three. Although no research has yet been done that addresses these two questions directly and clearly, there is no doubt that the maximum class size permitted in preschools has to be reduced drastically in order to improve the quality of education provided to the children (the maximum is currently 35, with an average of 31).

Given the developmental needs of young children, it is recommended that the standard preference in many countries be adopted: 14 to16 children in a class of 3- to 4-year-olds (depending on the number of 4-year-olds), 16 to 20 in a class of 5- to 6-year-olds (depending on the number of 5-year-olds), and 25 children in a first-grade class. It is recommended that each age group in the preschool have a preschool teacher and a teacher's aide.

The adult-child ratio in preschools is particularly important in Israel, where preschools are separate institutions, unlike in most Western countries, where, because they are an integral part of primary schools, preschool teachers do not work in isolation and can receive help from the school staff. Note, too, that the variable with the greatest impact on children's learning is the level of training of the educational staff and the presence of a teacher with a teaching certificate and an academic degree in preschool education. It has

also been found that the factor with the greatest impact on pupils' reading and arithmetic achievements is whether the teacher has taken courses that train her to teach these specific subjects.

Recommendations: The Optimal ratio of adults to children in preschool and teacher certification

1. The preferred ratio is a teacher and a teacher's aide for each group of 14 to16 children aged 3 to 4, for every 16 to 20 children aged 5 to 6 (depending on the number of the younger children in the group), and for every 25 children in first grade.
2. It is important to have a teacher with a teaching certificate and an academic degree in preschool education for each group of children.

2. Preschool hours and the age of entry into preschool

Studies on the effects of the number of daily and weekly hours spent in preschool do not indicate a difference between a long and short school day and school week with regard to the pupils' achievements, social abilities, and health. Nevertheless, most preschool programs for children in the Western world have a five-day week. Only those that target disadvantaged populations have a long school day. In Israel, preschools and the lower primary grades are in session six days a week, but in most educational settings the school day is short.

In this context, in addition to the preschool hours, the age at which children start preschool should be addressed. The amendment to the Compulsory Education Law (5744/1984) providing for free, compulsory education for children aged 3 to 4 years is being implemented gradually and is not yet in effect countrywide. Children from lower socioeconomic strata enter preschool less ready to learn than other children, but they are more strongly affected by schooling than others.

Recommendations: Preschool hours and the age for starting preschool education

It is recommended that children from lower socioeconomic groups have the opportunity to start preschool early (at age 3) and be given the opportunity to benefit from a long school day.

3. The organizational structure of the preschool

The preschool system in Israel is organized according to three different models: the traditional separate nursery school/kindergarten; a younger division in a primary school; and the preschool cluster. The coexistence of these different models is not unique to Israel, but the advantage of one model over the others has not yet been demonstrated.

It seems, nevertheless, that the cluster model makes it possible to derive maximum benefit of the resources available to the children, parents, teachers, and educational staff. A preschool cluster is an arrangement that incorporates several preschool classes in a single educational setting with a single principal. The classes within the cluster maintain their autonomy and can respond to the needs of the educational system in general and to the needs of the children and teachers in particular. This model makes it possible to benefit from the inherent advantages of school size without detracting from the intimacy of the preschool setting. For example, a cluster of several preschool classes can pool resources for teaching activities and staff training, providing many more supervision and enrichment services for both teachers and children. Combining several preschool classes in a single cluster can also lead to savings on auxiliary personnel, building and grounds maintenance, and food services.

Because of the high cost of building one physical structure that houses a preschool cluster, thought should also be given to running a virtual cluster, created by linking several preschools even without geographical proximity. Such a virtual cluster of preschools would permit optimal use of the auxiliary professional forces and the design of an effective preschool support system. A virtual preschool cluster can meet the children's individual, educational, and social needs, as well as providing more enrichment, support, and supervision for teachers and staff.

Recommendations: structure of preschools

There is a need for research to determine the effectiveness of various organizational structures, including preschool clusters and virtual preschool clusters, and their potential contribution to the quality of education received by very young children.

D. RECOMMENDATIONS FOR FURTHER RESEARCH

The committee's recommendations and conclusions are based on the findings of research studies that have addressed each of the topics it dealt with. A review of the existing research indicates an urgent need for further study to clarify fundamental issues related to the process of learning and teaching, in order to help educational decision-makers. The committee would like to point out several directions for research not yet conducted that could help those who must confront questions associated with the modes of preschool education and their potential for extracting the most from primary schooling.

1. Examination of educational approaches and curricula

- There is a need for studies that compare the effectiveness of different educational approaches and evaluate their suitability for children with different characteristics.
- Longitudinal studies should be conducted, following children who learned reading, writing, arithmetic, and the arts through different approaches.
- There is a need for comparative studies to investigate the effect of the age at which children are first taught to read on their achievements throughout their schooling. There is also a scarcity of information on the impact of early reading on the emotional, social, and cognitive development of young children.
- The associations between linguistic knowledge, linguistic awareness, and morphological and phonological knowledge need to be investigated, as does the general impact of teaching the vowel points (*nikud*) when teaching children to read Hebrew.
- Additional studies are needed on the promotion of emergent writing and teaching writing as well as on their effects on children's achievements in school.
- There is a lack of basic and applied research on the development of quantitative thinking in early childhood and on the impact of interventions intended to promote mathematical thinking among preschool - and school-age children.
- Preschool arts programs should be studied. This research should focus on the goals of the programs, their outcomes, and their contribution to the development of creativity and to children's development in other areas. It is recommended that the impact of exposing children to artists' activity and to works of art be investigated.

- Research on science education should be expanded, and the effectiveness of different methods of science education and their contribution to the development of scientific thinking should be compared.
- Educational experiments conducted with the support of the Ministry of Education, including structural and process innovations, should be followed by research that could make it possible to draw operative conclusions.

2. The quality of emotional, social, and teaching interactions

- Action should be taken to determine the most effective methods of assessing the quality of interactions between teachers and young children and the impact of intervention programs on these interactions. This matter is especially important for children identified as being developmentally at risk.

3. The effect of structural variables on children's development and achievement

- Further research is needed on optimal class size, the teacher-pupil ratio, and the length of the school day and week, and on the impact of these variables on children's scholastic achievement and general behavior. Longitudinal studies should be conducted, following pupils who attended different types of preschools, including the traditional kindergarten, the preschool cluster, and the "young division" in a primary school.

4. Teacher training

- The relationship between the teacher's characteristics and training and pupils' achievements should be studied. For example, do Israeli children whose teachers work part-time have lower achievements than pupils of full-time teachers?
- There is a need for research focusing on the effectiveness of teachers' professional in-service training and its effects on teachers and pupils, including the quality of instruction, interactions between teachers and pupils, and pupils' achievements and behavior.

5. Self-regulation

- There is a need for research focusing on self-regulation, in order to clarify whether criteria of self-regulation are applicable in different contexts and what the effect of the context is on different kinds of self-regulation and their intensity. Such knowledge could be applied in planning classes and curricula that would encourage pupils to improve their self-regulation and to implement appropriate strategies of self-regulation in various contexts.

6. Education in a multicultural society

- Issues associated with fostering and promoting learning among special populations of children should be studied. Among the issues addressed by this research should be the significance of developing culturally relevant curricula that relate to specific groups within a multicultural society.

Introduction

The experiences of small children lay the foundation for their development throughout their lives and have received extensive professional and public attention. Early childhood is a particularly sensitive time, a window of opportunity for cognitive, emotional, and social development, and therefore extensive resources and efforts are put into discovering what components of childcare and education at this age facilitate optimal development. The importance and impact of early-childhood education make it necessary to focus on improving pedagogical approaches and curricula and to tailor them to the children's needs and to the educational goals of their parents and of the society in which they live. Moreover, research evidence indicates that investments of public capital in early-childhood education pay off economically in the short and long terms (for more detail, see, e.g., Barnett and Masse 2006; Bracey and Stellar 2003; Heckman 2000, 2004, 2006). There is no doubt today that the existence of educational settings for small children starting at age three and the quality of childcare provided in them exert a strong influence on the children and on society as a whole.

Many Israeli toddlers and small children spend a great deal of time in private and public educational settings. Consequently, high-quality educational institutions are needed that will provide them with appropriate emotional, social, and cognitive experiences and will function in the best ways possible in order to prepare them for school and for adult life. It therefore comes as no surprise that the importance of early-childhood education and its impact on the development of individuals throughout their lifetimes have not only received extensive attention in the research literature but have also been recognized by society and governments in various countries around the world. In Israel this recognition is manifested in the basic plan for pre-primary education outlined in the *Director-General's Bulletin* (Israel Ministry of Education 1999/2000), which states that "education in early childhood is the foundation for children's overall education" (ibid., section 2.1).

In 1999/2000, Israel started implementing an amendment to the Compulsory Education Law, 5744-1984, that extends free and compulsory education to children aged 3–4. Implementation is being done gradually; within ten years it will encompass all children in this age group. As a result, the day is not far off when all Israeli children will attend preschool from age 3. This fact makes the quality of education provided to children in preschools even more important.

Differences in children's development are due to numerous factors—genetic, social, cultural, and other—but the quality of early-childhood education and the tailoring of this education to each individual child are highly significant in developing the children's abilities in general and preparing them for school in particular (Barnett 2002).

Many theorists have discussed the process of early child development, including the development of personality (e.g., Sigmund Freud and Erik Erikson), cognitive elements (e.g., Jean Piaget and Lev Vygotsky), and emotional elements (e.g., Lawrence Kohlberg and Stanley Greenspan). In addition, the goals and means of education and ways of ensuring optimal child development have received extensive theoretical attention and have been revised in accordance with the spirit of the times and place. A brief overview of prevalent pedagogical approaches to children's education since the beginning of the twentieth century shows a wide range, from the theories of Rudolf Steiner, John Dewey, and Edward Thorndike published in the first decade of the century, to the ideas of A. S. Neill, Emile Durkheim, Lev Vygotsky, Jean Piaget, and B. F. Skinner introduced in the 1920s and 1930s, and finally to the proposals of Benjamin Bloom, Jerome Bruner, Abraham Maslow, Carl Rogers, Michel Foucault, Carol Gilligan, and Howard Gardner in our own days.

Not only are there many different educational theories; in addition, the practical application of the theories has varied widely. It would be no exaggeration to say that there are numerous differences between schools in different societies and even between different classes, each of which is a microcosm on its own. Ultimately, then, learning is the outcome of the unique interaction that takes place in every school and in every class. Therefore, many educators and researchers in recent years have focused not only on what constitutes good education, but also on questions concerning the factors and conditions that enable students with different traits to succeed in school, and on ways of adapting education to their needs so that they can all maximize their learning potential.

The committee's work, described below, focused on identifying the methods of early-childhood education that result in optimum development and success of all children in the school. The task of the committee was to survey, examine, and summarize the research findings regarding our understanding of methods of education, the teaching process, and aspects of care for preschool-aged children, in connection with the promotion of optimum development and academic success in the first years of school. The committee also discussed questions asked by the professional echelons in the Ministry of Education, having to do with various aspects of preschool

education—the preschool building, the number of adults in each preschool and their roles, the curriculum, and the effects of childcare and education in the preschool on subsequent functioning in school. The committee members, who represented diverse lines of thought and a variety of specialties, were asked to reach agreement on the elements of education that are essential to child development, and to point out their ramifications for preschool education, including childcare, curricula, and teacher-training.

It should be noted that many studies, as well as several committees in various countries, have addressed issues related to those discussed by the present committee. These were all used by the committee members; they served as a basis for the committee discussions, and some of their conclusions were even adopted by the committee. In order to update its knowledge of early child development, the committee relied, for example, on the findings and conclusions of a comprehensive research report published by the U.S. National Academy of Sciences (*From Neurons to Neighborhoods: The Science of Early Child Development*; see Shonkoff and Phillips 2000). The main assumptions included in this report were adopted in full by the committee members. Additional documents published by the National Academy of Sciences contributed background material for the committee's work; especially worth noting is the report *Eager to Learn: Educating Our Preschoolers* (Bowman, Donovan, and Burns 2001). Research reports describing education systems in various countries and their students' achievements also served as background material. The committee referred frequently in this context to various publications of the Organisation for Economic Co-operation and Development (OECD 1998–2000, 2003–2004), including *Thematic Review of Early Childhood Education and Care Policy* and international research reports on reading and science (Mullis, Martin, and Foy 2005), as well as the World Health Organization's report on high-risk behaviors (WHO, 2004).

The committee members also made extensive use of the findings of comprehensive longitudinal studies that have made unique contributions to our understanding of the characteristics of various early-childhood educational settings, their impact, and their contribution to the children's development. Especially noteworthy are a longitudinal study carried out in the United States by the National Institute of Child Health and Human Development (*Child Care and Child Development*; see NICHD 2005); the Effective Provision of Pre-School Education project, conducted in England from 1997 to 2004 to examine the impact of pre-primary education on child development (Sylva et al. 2004); and a study conducted by the National Center for Education Statistics in the U.S. Department of Education (*Early*

Childhood Longitudinal Study: Kindergarten Class of 1998–99; see U.S. Department of Education 2006). Additional longitudinal studies, meta-analyses, and surveys of the various fields addressed by the committee served as a basis for the chapters of this volume, and they are cited in each chapter separately.

While relying on certain studies conducted outside Israel that involved comprehensive research protocols, large samples, and diverse research methods, the committee also focused on studies conducted in Israel that were related to the local living conditions, culture, language, and education system. In each case the suitability of the particular research study to the structure of the Israeli education system and local culture was examined.

No child enters preschool as a *tabula rasa*, and educational influences in preschool are not the only factors to leave their imprint on children's growth and development. Many studies give evidence of the impact of the home and family on child development and on learning in infancy and in subsequent years, and of the need to address this impact in a unique manner, especially when the children come from a different cultural and family background, in order to improve their education at a later age. Furthermore, in addition to the public preschools starting at age 3 under Education Ministry supervision, there are educational childcare settings for younger children, known as daycare and family child care, which affect the early education of many children. Most of the daycare centers and family child care settings in Israel are run by nonprofit organizations, such as women's organizations, community centers, and various associations. Since 2002, their activity has been regulated by the Department of Daycare and Family Child Care for Early Childhood in the Ministry of Industry, Trade, and Labor. Government activity in this regard is based primarily on the Supervision of Daycare Centers Law, 5725-1965; the Price Stability of Goods and Services (Maximum Prices for Daycare and Family Child Care) Order; and the Social Work Regulations. Recently an advisory board was established to license and develop standards for early-childhood educational settings. In 2005 its recommendations were submitted to the heads of the Ministry of Industry, Trade, and Labor.

According to the Central Bureau of Statistics (CBS 2005), 429,396 children were enrolled in preschools and daycare centers in Israel in 2003/04, 343,971 of them in the Jewish sector and 85,425 in the Arab sector. These children were in 13,326 preschools and daycare centers, 10,777 of them Jewish and 2,549 of them Arab. It should be noted that 132,300 of the children in pre-primary education are aged 5–6 (and are apparently in

kindergarten); 100,100 of them are in Jewish settings and the others are in Arab settings (Sprinzak, Bar, and Levy-Mazlum 2005, table C.4).

In 2003/04, a total of 258,524 children were enrolled in Jewish preschools supervised by the Ministry of Education—50% in the State system, 20% in the State-Religious system, and 30% in haredi preschools. In the Arab sector, 81,100 children attended preschools supervised by the Ministry of Education (CBS 2005). The teaching staff in pre-primary education numbered 11,340 persons that year, 9,320 of them in Jewish preschools and 2,020 in Arab preschools (Sprinzak Bar, and Levy-Mazlum 2005, tables D.2, D.3).

In 2003/04, the enrollment rate for ages 0–6 in all types of preschools was 450 per thousand children; for ages 3–6 the figure was 664 per thousand, and 636 per thousand in preschools under Education Ministry supervision. The enrollment rate in all kindergartens (age 5) was 934 per thousand that same year (CBS 2005).

From a budgetary standpoint, in comparison with other countries, national spending per pupil on pre-primary education in Israel in 2001 ($3,428) was lower than the average for OECD countries ($4,490). The data for the year 2000 indicate that this expenditure (NIS 12,100) was about 9% of all national spending on education, with public spending accounting for 75% of national spending (the rest was funded by households, nonprofit organizations, and donations) (Sprinzak Bar, and Levy-Mazlum 2005, tables B.13, B14).

The present committee's conclusions and recommendations are meant to help educational decision-makers provide optimal education in preschools and to enable the children attending the preschools to fulfill their potential. The committee report discusses developmental, pedagogical, and structural aspects. The committee's main recommendations are listed separately in the executive summary, and the research foundation for each of the recommendations appears in the full report. In order to make evidence-based practice and policy possible, the committee made sure to base its recommendations on agreed-upon, carefully reviewed research findings. It did not discuss methods of education and did not recommend any unless they were supported by research. Where the evidence from research was insufficient or absent, and where the research findings did not permit deciding between different approaches, the committee noted this explicitly.

Finally, this report is the product of a consensus committee including leading scholars from various academic disciplines. The committee worked on the basis of an outline produced by the consensus committee of the

National Research Council of the U.S. National Academies; experts from various fields were brought together on the assumption that combining research-based knowledge from different disciplines would enhance the discussion and validate the findings. All the committee members participated in the discussion of each of the topics, and all the conclusions were adopted unanimously by the committee members following these discussions.

The committee's recommendations are the first stage in laying the foundations for using existing research-based knowledge to improve preschool education in Israel. Educational decision-makers, from teachers to the Ministry of Education, are invited to make use of them—in curricula, in organization of the preschools, and in training educators—and to add to the constantly growing body of experience and knowledge. In addition, the committee pointed out areas that it did not address, areas that should be put on the agenda, and vital avenues of research.

As stated, the committee did not purport to decide what kind of education is good for each child; rather, its task was to recommend, based on the currently available research literature, methods of early-childhood education that have proven to contribute to optimum child development in various respects and to success in school. The present report is a summation of the committee's work and recommendations.

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Appendix 2:
Members of the committee on modes of education for ages 3–8

Prof. Pnina S. Klein
Prof. Klein is a professor of education at Bar-Ilan University. She heads the Baker Center for Research and Treatment of Children with Special Needs and holds the Machado Chair for Research on Human Modifiability and Development of Intelligence. She is a developmental psychologist with a doctorate in education from the University of Rochester and has developed methods for studying the quality of communication and interactions with children and for representing and evaluating its potential impact on child development. Her research has been conducted in Israel, various African, Asian, and European countries, and the United States, with the support of international organizations. Prof. Klein is a member of the Council for Higher Education in Israel, has headed numerous research committees, represents Israel in the World Forum on Early Care and Education, and is a member of the board of the Oslo-based International Child Development Programmes. She has published numerous books and dozens of research studies, has been a visiting professor at American universities, and serves as a child-development consultant for organizations in various countries.

Prof. Shoshana Blum-Kulka
Prof. Blum-Kulka is a professor emeritus in the Department of Communication and Journalism and the School of Education at the Hebrew University of Jerusalem. She is a sociolinguist with a doctorate from the Hebrew University. Her main research interests are discourse, pragmatic development, and language education. Prof. Blum-Kulka headed a committee to design a curriculum for teaching Hebrew as a first language, and she currently heads a committee to design a curriculum for teaching Hebrew as a second language. She was a visiting professor at the University of London and at Harvard University, and has published numerous books and papers that explore various issues pertaining to translation, cross-cultural communication, family discourse, media discourse, and pragmatic-linguistic development. In recent years she has headed a longitudinal study on the development of various kinds of literacy discourse among preschoolers and pre-adolescents in Israel.

Dr. Tali Gorali Turel
Dr. Gorali Turel is a lecturer in the creative education, early childhood, and special education tracks at State Teachers' College–Seminar Hakibbutzim and is the coordinator of the music education staff at the college. She has a doctorate from Bar-Ilan University. Her main research interests are musical development from birth to age six; the musical experience in early childhood and musical memories of adults; intervention to promote phonological development in preschoolers and its impact on pre-reading skills; surprise, curiosity, and investigation in infants, toddlers, and small children; and facial expressions and gestures in early childhood and their interpretation by educators. Dr. Gorali-Turel develops programs for early-childhood education in the fields of music, phonology, literature, and folk music, as well as

intervention programs for weak population groups, for the Hebrew University, Ministry of Education, and CRB Foundation. She is a member of the music education committee of the Ministry of Education.

Prof. Avishai Henik
Prof. Henik is a professor of psychology at Ben-Gurion University of the Negev. He is the dean of the Faculty of Humanities and Social Sciences and holds the Zlotowski Chair of Cognitive Neuropsychology. Prof. Henik has a doctorate from the Hebrew University of Jerusalem, which he earned under the supervision of Prof. Daniel Kahneman. He did post-doctorate studies for two years with Prof. Michael Posner in the Department of Psychology of the University of Oregon and at the Neurological Sciences Center in Portland, Oregon. His research focuses on cognitive neuroscience, especially attention, processing of individual words, and processing of numerical information. In recent years his research has expanded to include learning disabilities. He previously headed the Department of Behavioral Sciences and the Zlotowski Center for Neuroscience at Ben-Gurion University of the Negev.

Prof. Iris Levin
Prof. Levin is a professor (emeritus) at the Tel Aviv University School of Education. An educational and developmental psychologist, she has a doctorate in psychology from the Hebrew University of Jerusalem. She specializes in the development of literacy and language in early childhood and sociocultural influences on this development; the effect of properties of the mother tongue and writing (Hebrew and Arabic) on literacy; and the impact of literacy at home and of the quality of parent-child interactions on child development. She studies intervention in Jewish and Arab preschools and families in order to improve educators' skills in fostering literacy. Prof. Levin has served on committees to promote reading and headed a committee to develop a literacy-promotion curriculum for Israeli preschools. She has published dozens of papers in international journals and numerous book chapters; she has also edited two scholarly books and a special issue of *Megamot* on children in Israel. Prof. Levin volunteers in the clinical unit of the Tel Aviv University law school, writing professional opinions on educational issues to be submitted to the High Court of Justice.

Prof. Zemira Mevarech
Prof. Mevarech is a professor of education and the vice rector of Bar-Ilan University. She previously served as director of the Bar-Ilan University School of Education and as chief scientist of the Ministry of Education. She has a doctorate from the University of Chicago and specializes in meta-cognitive teaching methods, focusing on science in general and mathematics in particular. She has been a visiting professor at American and European universities and has participated in numerous international conferences. She has published dozens of papers in prestigious journals. Prof. Mevarech is the principal investigator and research director for PISA 2000, 2006 in Israel.

Dr. Miriam Mevorach
Dr. Mevorach is the head of Lewinsky College of Education and a former academic coordinator and early-childhood coordinator at the college. She has a doctorate from Tel Aviv University, and has taught at Tel Aviv University. She currently spends her time teaching and conducting research at Lewinsky College. Her main research interests are teachers' cognition and practical intelligence in young children. Dr. Mevorach has participated in dozens of international conferences, was in charge of evaluation and approval of educational software for early childhood in the Israeli education system, chaired the early-childhood team for the Dovrat Commission, and was a member of the educational continuum subcommittee of the Dovrat Commission. She is a member of early-childhood steering committees for the Pre-Primary Division of the Ministry of Education and for the city of Tel Aviv and develops training programs for early childhood.

Prof. Avi Sagi-Schwartz
Prof. Sagi-Schwartz is a professor of psychology, head of the Center for the Study of Child Development, and former dean of the graduate school at the University of Haifa. He holds bachelor, master, and doctoral degrees in social work and psychology from the University of Haifa and the University of Michigan. His main research interests are socio-emotional development from a multicultural perspective and across the life span; adaptations and coping of children to extremely stressful life situations; children at risk and services for children; transformation and application of scientific knowledge to childcare and early-childhood education; and public policy, law, and legislation pertaining to children. Prof. Sagi-Schwartz is a visiting professor at various American and European universities. In 2005 he held the Mary Main Chair on Attachment across the Life Span at Leiden University, and in 2005/6 he was a Jennings Randolph Senior Fellow at the United States Institute of Peace in Washington, D.C. He serves as a referee and member of the editorial boards of world-renowned journals and is one of the editors of the *Early Childhood Research Quarterly*. He has been awarded numerous research grants, has appeared at more than 200 international conferences, and has produced more than 100 scholarly publications. He is the recipient of the 2007 Award bestowed by Society for Research in Child Development for "international contributions to the field of child development"

Dr. Yaacov B. Yablon
Dr. Yablon is a lecturer at the Bar-Ilan University School of Education. He graduated summa cum laude from Bar-Ilan University with a bachelor's degree in psychology and education and earned a doctorate in education with distinction from Bar-Ilan as well. He did post-doctoral work at Harvard University as a Fulbright scholar. Dr. Yablon deals with emotional aspects of behavior and learning, and his research focuses on high-risk behaviors of schoolchildren, prevention programs, and peace education. He has presented his research at numerous conferences and has published it as book chapters and as papers in international journals.
Dr. Yablon is a member of the Initiative staff and the director of this study

Non-committee members who contributed to the literature survey

Dr. Andrea Berger, head of the developmental psychology program in the Department of Behavioral Sciences, Ben-Gurion University of the Negev, co-authored "The Development of Self-Regulation: Nature and Nurture."

Dr. Motti Gini of the Center for the Study of Child Development, Department of Psychology, University of Haifa, helped write "Strengthening Confidence through Emotional and Social Teacher-Student Relationships."

Dr. Sharona T. Levy of the Department of Education, Faculty of Education, University of Haifa, wrote the appendix, "Early Childhood Science Education."

Dr. Esther Adi-Japha of the School of Education and Gonda (Goldschmied) Multidisciplinary Brain Research Center, Bar-Ilan University, co-authored "Teaching Reading and Writing."

Prof. Ora Kofman, head of the neuropsychology program in the Department of Behavioral Sciences, Ben-Gurion University of the Negev, co-authored "The Development of Self-Regulation: Nature and Nurture."

Dr. Rachel Schiff of the Bar-Ilan University School of Education, head of the Haddad Center at Bar-Ilan, co-authored "Teaching Reading and Writing."

Sources of the Illustrations

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8. Appendix, p. 318: Standard 1.002: Ratios for large family child care homes and centers. *Caring for Our Children: National Health and Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs* (2nd ed.). By kind permission of the American Academy of Pediatrics.