DEVELOPMENT OF AN ELECTRONIC DIARY FOR THE CHILDREN*

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In the present paper, an electronic diary for the children, Children's diary is represented, which is free and easy to use database management system with the milestones from the children's life. The basic purpose of this program is to serve as an audio and video archive of children's favorite moments. Children's diary allows storage of records for different stages of children's life – for pregnancy and baby's first skills as well as events of the grown child's life (holidays, vacations, activities, etc.).

The electronic diary provides a possibility for searching, previewing and printing the diary for the pregnancies, the children's diary and the feeding's diary, as well as exporting in PDF file. The interface of the program is implemented in Bulgarian language.

1. Introduction. Because of the advance of the information technologies it is possible the development of increasingly various programs facilitating the users at organizing data used in all areas of the public life.

Utilizing an elecronic diary for the children provides a possibility for the user to create an audio and video archive with the important moments during the pregnancies and the unique events from the children's life. Additional advantages are the storage of the immunization calendar, the maintenance of the feeding's diary, searching and printing the records from the diaries for the pregnancies, the diaries for the children.

1.1. Basic features of the software for organizing the milestones from the children's life. The software for organizing the milestones from the children's life have to offer possibilities that facilitate the user in the storage and searching the notes, the pictures, the sounds and the video reflecting the turn of the pregnancy and happenings from the life of the children. The basic features of such kind of software are:

- *Ease of use.* The practical software has to be easy to manage and use, so each user is able to perform by comfortable way basic tasks with the software regardless of his computer knowledge.
- *Ease of installation and setup.* The program should be easy to set up and install, offer detailed instructions and do not cause errors.

- *Help information and documentation.* The software creators should provide sufficient help and support including user's guides and an email address to contact.
- *Diaries for pregnancies, children and feeding.* The considered kind of software has to offer possibilities for organizing data about the pregnancies and the children, for storage of the detailed information (notes, pictures, sound, video) for particular moments and events, as well as to allow searching by different criteria. With the feeding's diary the user can save the feedings of the children by dates and hours.
- *Monitoring the changes in the height, the weight, the head circumference of the children.* Monitoring the changes in the height, the weight, the head circumference of the children includes entering these parameters for the particular months and the visualization in a graphical view.
- *Immunization calendar.* The electronic diary for the children has to provide a maintenance of the immunization calendar: the turned age, the immunization, the vaccine, the way of application for the forthcoming immunizations, as well as entering the date of immunization.

The aim of the development of the electronic diary for the children *Children's diary* is to propose a free program with an interface in Bulgarian language, in which all basic requirements to the software for organizing the milestones from the children's life are implemented.

The rest of the paper is organized as follows. In section 1.2, the basic characteristics of the existing programs for organizing the milestones from the children's life are considered; in section 1.3, a comparative analysis of these programs is made. In section 2.1, the main features of the program *Children's diary* are concisely reviewed. In section 2.2, the methodology of designing the database for storing the information about the pregnancies and the children is represented. The entity-relationship model (*ER model*) of the database is proposed and the relational tables obtained after the transformation of the created ER model into relational are represented.

1.2. Review of the existing programs for organizing the milestones from the children's life. There are several web sites which are implemented with an interface in Bulgarian language and offer similar services online [3, 4, 5, 11]. For the users preferring to use software installed on their personal computers for this aim, commercial and free electronic diaries for the children are developed. Some of the popular programs for organizing the milestones from the children's life are considered below.

Baby Diary [2] is a commercial program which serves for recording the most important moments from the child's life. By means of this program the user can enter the changes in the height and the weight of the child, easy and immediate attach pictures and video files, as well as create web site on the basis of the stored information. *Baby Diary* allows outputting graphs of the height, the weight and the head circumference of the baby, printing the diary. The program has multilanguage interface including Bulgarian, Russian, English, French, German and other languages. The help information is entirely in English, as well as a part of the interface.

Baby Ace [1] is a commercial program which provides for the user a possibility to store and share records from the favorite moments from the children's life, by adding pictures and audio files. Besides, the user can maintain a diary for the pregnancy and an immunization calendar. The program's interface is easy to use and is based on technology from the Internet browser area. *Baby Ace* is implemented with an interface in English

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language.

Baby Journal [10] is a commercial program for monitoring the important moments from the child's life. It allows addition of the notes and the pictures.

Pregnancy Journal [12] is a free program which represents a diary-calendar for pregnant women in an electronic view. It allows addition of the pictures, noting the turn of the pregnancy and creation of the more than one diaries.

1.3. Comparative analysis of the programs for organizing the milestones from the children's life. The criteria used for comparison of the reviewed software products are the basic requirements to the software from the considered type, which are specified in section 1.1. The commercial programs *Baby Diary* and *Baby Ace* realize in the highest degree the listed basic requirements, but they does not offer a possibility for maintenance of the diary for feeding and their interface is not entirely in Bulgarian language.

The program *Pregnancy Journal* is free and created with an interface in Bulgarian language, but it is intended for entering only a diary for the pregnancies.

The basic motivation for the development of the electronic diary for the children *Children's diary* is the lack of a free program with an interface in Bulgarian language that satisfies all basic prerequisites of the software for organizing the milestones from the children's life. The implemented program can be accessed from [14].

2. Electronic diary for the children *Children's diary*. The electronic diary for the children *Children's diary* is free and easy to use database management system with the milestones from the children's life. This program supports the user to store and organize the unique moments from the life of his children. The interface of the program is implemented in Bulgarian language. Besides, the user's guide is created where the program's features are described in detail.

2.1. Basic features. *Children's diary* allows addition, edition and deletion of the diary for the pregnancies; the diary for the children; the diary for feeding; storing notes, pictures, sound, video, related to the concrete moments; monitoring the changes in the height, the weight, the head circumference of the children by months and their visualization in a graphical view; maintaining the immunization calendar.

The electronic diary disposes with an extended function for searching the records in the diary for the pregnancies, the diary for the children and the diary for feeding in the database. The records in the diaries can be searched by a pregnancy, a child and/or a date or a period.

The program provides a possibility for previewing and printing, as well as exporting in PDF file the diary for the pregnancies, the diary for the children and the diary for feedings.

2.2. Data modeling. In this section, the methodology for designing the database ChildrensDiaryDB, storing the information about the pregnancies and the children, is represented. The main stages of the process of designing the database are [7]:

- conceptual designing the database – creation of the conceptual data model which is completely independent from the details related to the implementation;
- logical designing the database – transformation of the conceptual model into the logical model;
- physical designing the database – implementation of the database with the means

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of a chosen database management system.

2.2.1. Conceptual designing. For the conceptual design of the database ChildrensDiaryDB we utilize the entity-relationship model, introduced in [6]. The following entity sets are established:

- *Pregnancies*;
  This entity set possesses five attributes: the identifier – *PregnancyID*, the name of the future mother – *WomanName*, the name of the future father – *FatherName*, the date of the conception – *PregnancyDate*, the expected date of birth – *TerminationDate*.
- *PregnancyDiary* – the diary for the pregnancies;
  The attributes of this entity set are: the identifier $--$ *PregnancyDiaryID*, the date of the record in the diary – *Date*, the title of the record in the diary – *Title*, the notes – *Notes*, the picture(s) of the record in the diary – *Pictures*, the audio file(s), related to the record in the diary – *Audio*, the video file(s), related to the record in the diary – *Video*.
- *Babies*;
  With the entity set *Babies* the following attributes are assigned: the identifier – *BabyID*, the name of the child – *Name*, the picture(s) of the child – *Pictures*, the gender of the child – *Sex*, the date of birth – *BirthDate*, the hour of birth – *BirthHour*, the name of the general practitioner of the child – *GPName*.
- *BabyDiary* – the diary for the children;
  This entity set possesses eight attributes: the identifier – *BabyDiaryID*, the category of the record in the diary – *Category*, the date of the record in the diary – *Date*, the title of the record in the diary – *Title*, the notes – *Notes*, the picture(s) of the record in the diary – *Pictures*, the audio file(s), related to the record in the diary – *Audio*, the video file(s), related to the record in the diary – *Video*.
- *BabyHeight* – the height of the children;
  The attributes of the entity set *BabyHeight* are: the identifier – *ID*, the date of measuring the height – *Date*, the height of the child in centimeters – *Height*, the notes – *Notes*.
- *BabyWeight* – the weight of the children;
  With the entity set *BabyWeight* the following attributes are assigned: the identifier – *ID*, the date of measuring the weight – *Date*, the weight of the child in kilograms – *Weight*, the notes – *Notes*.
- *BabyHead* – the head circumference of the children;
  The attributes of the entity set *BabyHead* are: the identifier – *ID*, the date of measuring the head circumference – *Date*, the head circumference of the child in centimeters – *Head*, the notes – *Notes*.
- *Immunizations*.
  This entity set possesses six attributes: the identifier – *ID,* the turned age – *Age*, the immunization – *Immunization*, the vaccine – *Vaccine*, the way of application – *Directions*, the type of the immunization (mandatory or advisable) – *Type*.

The following relationships are defined:

- *PreDiary_of* – joins each entity from the set *PregnancyDiary* with an entity from *Pregnancies* and describes the records from the diary referring to the corresponding pregnancy.

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- *Born* – joins each entity from the set *Babies* with an entity from *Pregnancies* and represents the child (children) borne at the end to the corresponding pregnancy.
- *Diary_of* – joins each entity from the set *BabyDiary* with an entity from *Babies* and describes the records from the diary referring to the child.
- *Height_of* – joins each entity from the set *BabyHeight* with an entity from *Babies* and describes the records for measuring the height referring to the child.
- *Weight_of* – joins each entity from the set *BabyWeight* with an entity from *Babies* and describes the records for measuring the weight referring to the child.
- *Head_of* – joins each entity from the set *BabyHead* with an entity from *Babies* and describes the records for measuring the head circumference referring to the child.
- *Imm_of* – joins entities from the set *Immunizations* with entities from *Babies* and represents the immunizations, given to the children. This relationship possesses two attributes: the date of the immunization – *Date* and the notes – *Notes*.

The entity-relationship of the database ChildrensDiaryDB is shown in Figure 1. The entity sets are depicted as the rectangles, their attributes – as ellipses, the relationships – as rhombs.
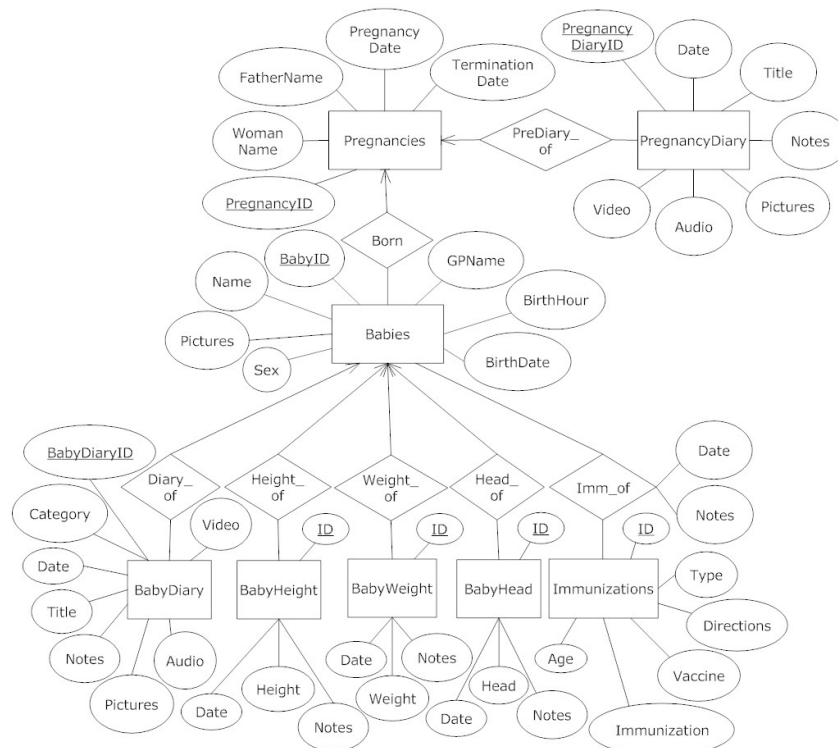

Fig. 1. ER diagram of the database ChildrensDiaryDB

2.2.2. Logical designing. The relation tables obtained after the transformation the entity-relationships diagram into the relational model are represented in Figure 2.
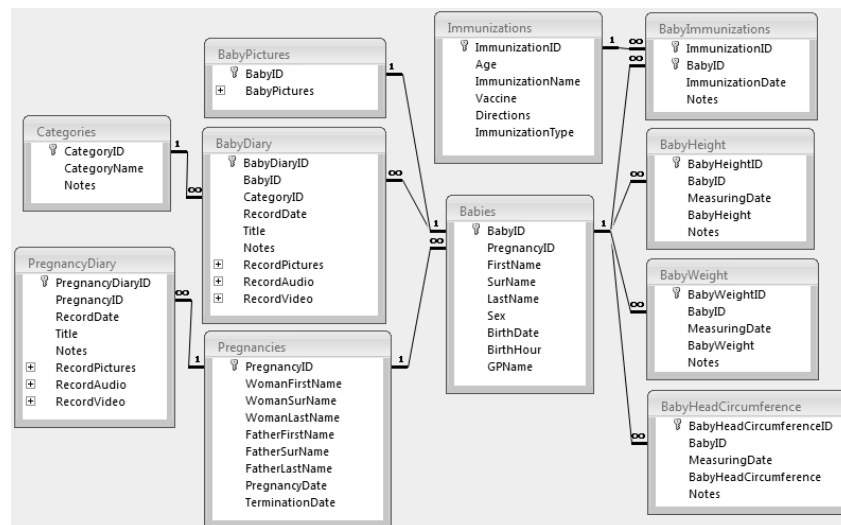
Fig. 2. Relational model of the database ChildrensDiaryDB

2.2.3. Physical designing. The database is implemented by means of the database management system Microsoft Access 2007 [8, 9, 13, 15]. The structure of the database is defined to provide the best efficiency of the most frequently used operations – insertion, updating, data searching.

The work with the program *Children's diary* does not require previously installation of Microsoft Access 2007. The implemented installation program of *Children's diary* installs Access Runtime, which is free and completely enough for starting and working with the electronic diary.

3. Conclusion. The aim of this paper is to represent the developed electronic diary for the children *Children's diary*. The program is free; it is implemented with an interface in Bulgarian language and allows organizing the favorite events from the pregnancies and the children's life. The users dispose with detailed description of the features of the program. Our future work includes description of the potential illnesses in children and maintenance of an address list of Web pages that provide useful information about pregnancy, parenting and children.

REFERENCES

[1] AcroVista Software, Baby Ace, http://www.babyace.com.

[2] Aktisoft, Baby Diary, http://www.aktisoft.com/BabyDiaryAbout.htm.

[3] Bebeshop.bg. Електронен календар за ръста и теглото на вашето бебе. http://bebeshop.bg/modules/blockmybaby/mybabyfront.php?op=hw_calendar.

[4] Beboran.net. Система от онлайн дневници на бременността и детски дневници. www.beboran.net.

[5] BgBaby.net. Сайт на Вашето бебе. www.bgbaby.net.

[6] P. Chen. The Entity-Relationship Model: Toward a Unified View of Data. *ACM Transactions on Database Systems*, **1** (1976) No 1, 9–36.

[7] T. M. Connolly, C. E. Begg. Database systems: a practical approach to design, implementation, and management. Addison-Wesley, 2005.

[8] M. R. Groh, J. C. Stockman, G. Powell, C. N. Prague, M. R. Irwin, J. Reardon. Access 2007 Bible. Wiley Publishing, Inc., 2007.

[9] T. Hennig, R. Cooper, G. L. Griffith, A. Stein. Access 2007 VBA Programmer's Reference. Wiley Publishing, Inc., 2007.

[10] Information Packaging – HelpTwins.com. Baby Journal. `http://pcwin.com/Home___Education/Baby_Journal/index.htm`.

[11] Moetodete.bg. Детски дневници. `http://www.moetodete.bg/dnevnici`.

[12] Moment of Peace. Електронен Дневник-Календар за бременни, `http://www.momentofpeace.net/2008/electronen_pregnancy`.

[13] M. Reid. Pro Access 2007. Apress, 2007.

[14] Цв. Георгиева-Трифонова. Children's diary 1.1: Електронен дневник за децата. Web сайт на списание Download.BG. `http://www.download.bg/index.php?cls=program&id=567618`, 2010.

[15] А. Ънсуърт. Access 2007. ИнфоДАР, София, 2007.

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РАЗРАБОТВАНЕ НА ЕЛЕКТРОНЕН ДНЕВНИК ЗА ДЕЦАТА

Цветанка Любомирова Георгиева-Трифонова

В настоящата статия е представен електронен дневник за децата *Children's diary*, който е безплатна и лесна за използване система за управление на база от данни с важните събития от живота на децата. Основното предназначение на тази програма е да служи като аудио и видео архив на неповторимите моменти от живота на децата. *Children's diary* позволява съхраняване на записи за различни етапи от живота на децата – както за бременността и първите умения на бебето, така и събития от живота на порасналото дете (празници, ваканции, мероприятия, др.).

Електронният дневник предоставя възможност за търсене, предварително преглеждане и отпечатване на дневника за бременностите, дневника за децата и дневника за хранене, както и експортиране в PDF файл. Реализиран е с интерфейс на български език.