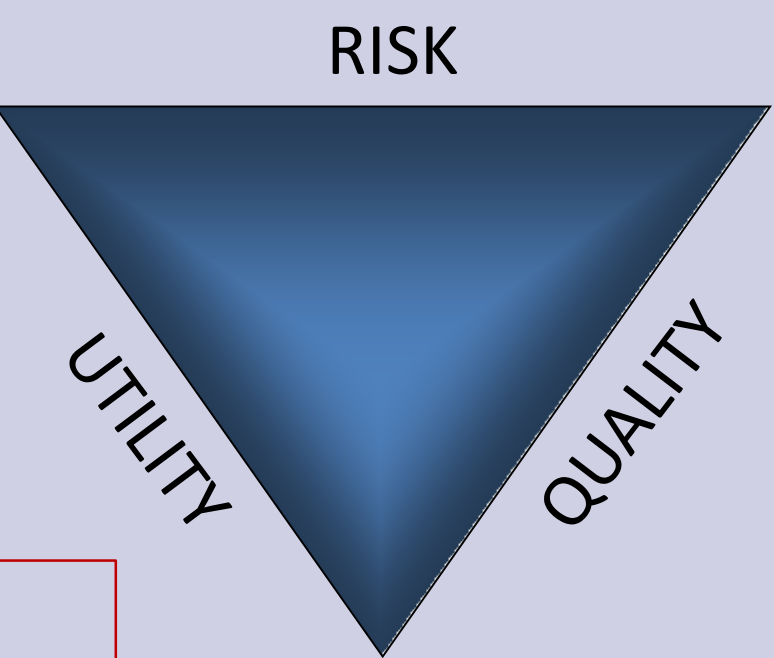


REDUCING DIAGNOSTIC ERROR IN MEDICINE

THROUGH THE POWER OF KNOWLEDGE MANAGEMENT

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1. Describe how knowledge management is at the core of solving the problems we face in the highly complex activity such as health care. 2. Explain how use of a Relational Database Management System [RDMS] to implement an electronic Knowledge Repository provides a means of implementing this knowledge management. 3. Discuss how an Associative Data Model [ADM] to structure the eKR provides a flexible means of classifying, investigating, and solving Diagnostic Errors.

SITUATION

Reduction of error in a complex activity like health care requires a clearly defined and well maintained core of knowledge that can be easily disseminated. This can be achieved through knowledge management. Although well-established in most areas of high risk human endeavor, knowledge management is all but ignored in the healthcare field. Yet it is the healthcare field that is most in need of this approach to reducing **Diagnostic Error in Medicine**.

PROBLEM

How can we leverage knowledge about **Diagnostic Error** to:

- RISK** Maximize patient safety with correct and timely diagnoses, accurately communicated and acted upon
- QUALITY** Minimize discomfort and the pain suffered due to wrong, delayed, or miscommunicated diagnoses
- UTILITY** Minimize expenditure of scarce resources through improved cost effective diagnostic processes

SOLUTION

The development of an **electronic Knowledge Repository [eKR]** based on **Associative Data Model [ADM]** is proposed as a structure and methodology to classify all types of knowledge available regarding **Diagnostic Error**. This approach provides the most effective means of flexibly creating, vetting, and disseminating knowledge. It can also be linked into the **eHR**.

The **eKR** will provide a central but widely distributed repository not only for knowledge about the causes of diagnostic error but also a about solutions which can be validated and shared.

IMPLEMENTATION

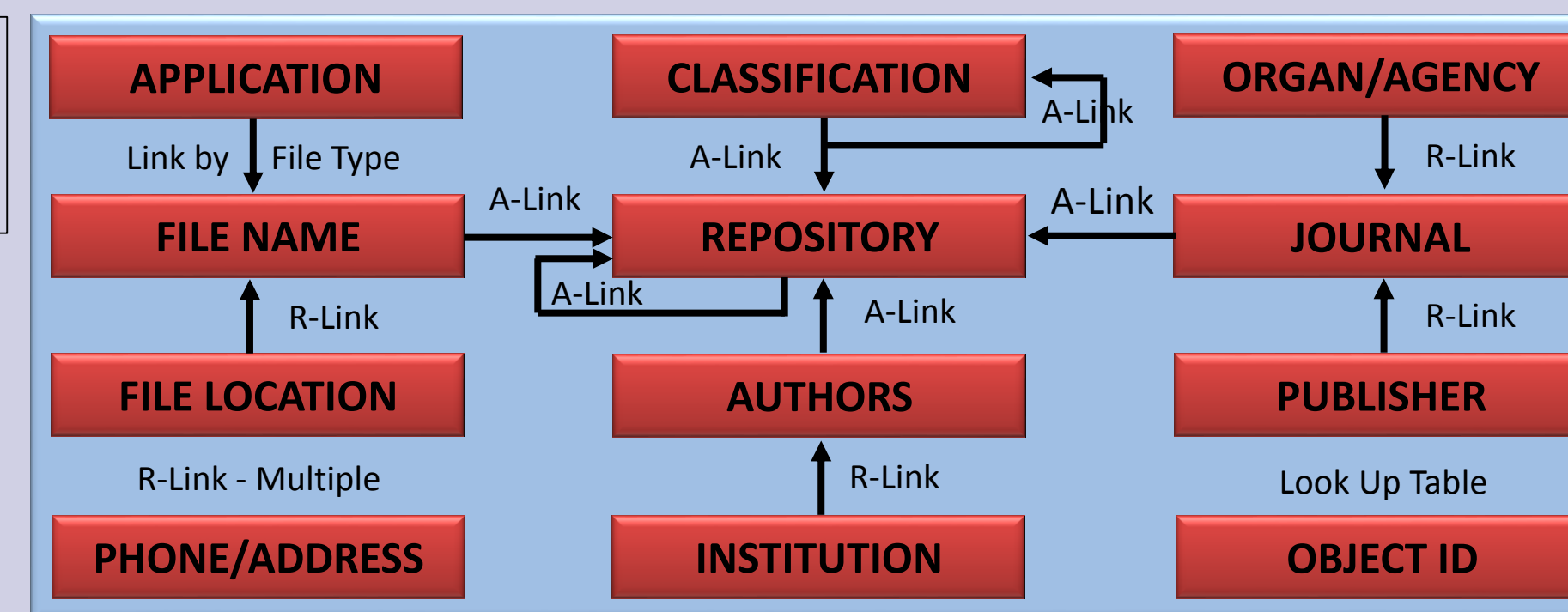
Shown are screen shots of a model system written in Visual Basic for Access [VBA MS ACCESS] working over a fully **Relational Database Management System [RDMS]** implementing an **Associative Database Structure [ADS]**. This provides the means of linking information hierarchically and nonhierarchically as well as linearly and nonlinearly. All this can be done without requiring information to be duplicated when linked to more than one knowledge structure. Relationships established are independent of each other allowing multiple knowledge structures to co-exist.

DATA TABLE DEFINITIONS [IN BRIEF]

TABLE	DESCRIPTION
REPOSITORY	Central table to which all other data is associatively linked
CLASSIFICATION	This allows flexible associative classification structures to be defined
FILE NAME	Allows for entering file name for associative linking to the repository
FILE LOCATION	Allows for entering file location for use in loading file in an application
APPLICATION	Allows the association of repository files with its display application
JOURNAL	Allows for entering the journal once and linking many
PUBLISHER	Allows for entering the publisher once and linking many
AUTHOR	Allows for entering an author once and using many
ORGANIZATION/AGENCY	Academic Institutions, Societies, federal agencies, and similar entities
PHONE AND ADDRESS	Central control over phone numbers and addresses for easy editing

RELATIONAL AND ASSOCIATIVE DATA RELATIONS [IN BRIEF]

- R-Link: Classical Relational One-to-Many Link
- A-Link: New Technology; Associative Many-to-Many Link



NOTE: CLASSIFICATIONS CAN BE EITHER HIERARCHICAL OR NONHIERARCHICAL AND CAN LINK TO THE SAME KNOWLEDGE RESOURCES

IN THIS CASE AN HIERARCHICAL STRUCTURE HAS BEEN CHOSEN AND THREE LEVELS DISPLAYED IN SEPARATE FORMS AS ILLUSTRATION

NOTE: THIS LINEAR DISPLAY OF CLASSIFICATIONS SHOWS TWO SEPARATE KNOWLEDGE STRUCTURES: FMEA AND SYSCOG TAXONOMIES

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COST BENEFIT ANALYSIS

The cost of the associative model is strictly up front programming, computing power, and storage space all of which are inexpensive.

The benefits are many including but not limited to:

- Multiple simultaneous, competing knowledge structures
- Sharing of resources between knowledge structures
- The modeling of very complex systems and processes
- The capacity to place conditions on associative links

SCOPE OF THE PROJECT

The actual deployable **eKR** will be based upon a highly reliable first tier programming language such as C++/#/Net, or Delphi married to a first tier relational database such as Oracle, DBII, or MS SQL to store text, images, video, and audio including but not limited to:

- Books/book chapters/pages/text blocks
- Journal articles
- Vendor publications
- Federal publications
- Private society publications
- Academic publications
- Internet sites
- Internet blog
- Email streams

Types of information to be stored includes but is not limited to:

- Taxonomy of diagnostic error
- Epidemiologic and statistical data on causes of diagnostic error
- Hypotheses and theories regarding cause of diagnostic error
- Proposed and validated solutions to reduce diagnostic error
- Structured documentation covering implemented solutions
- Evaluation of the above subject matter by **SIDM** membership

CONCLUSION

Development of an **eKR** based on an **Associative Data Model [ADM]** will provide the operational tool necessary to classify, investigate, and solve complex problems in healthcare including validating proposed solutions and disseminating them to:

REDUCE DIAGNOSTIC ERROR IN MEDICINE

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