INFORMATION AND KNOWLEDGE MANAGEMENT IN TEACHER EDUCATION

14TH ANNUAL NATIONAL CONVENTION EDUCATION 4.0: CHALLENGES AND DIRECTIONS NOVEMBER 28, 2018 THE HERITAGE HOTEL, MANILA

ICE BREAKER

RAISE YOUR RIGHT HAND IF YOU ARE CURRENTLY A TEACHER A TEACHER EDUCATOR A SCHOOL ADMINISTRATOR A RESEARCHER



THE RESOURCE PERSON



- GRADUATE OF BS COMPUTER SCIENCE SPECIALIZATION IN SOFTWARE TECHNOLOGY @ DLSU
- ONGOING MS INFORMATION TECHNOLOGY WITH RESEARCH INTERESTS ON EGOVERNMENT AND ICT FOR DEVELOPMENT (ICT4D) @ DLSU
- ENGAGED WITH GOVERNMENT, DEVELOPMENT AND ACADEME SECTOR SINCE 2007
 - COUNCIL FOR THE WELFARE OF CHILDREN (PROJECT)
 - DEPARTMENT OF SOCIAL WELFARE AND DEVELOPMENT (PROJECT)
 - CATHOLIC RELIEF SERVICES PHILIPPINES (EMERGENCY RESPONSE)
 - WORLD BANK DC AND WORLD BANK PHILIPPINES (CONSULTANCY)
 - NATIONAL ANTI POVERTY COMMISSION (CONSULTANCY)
 - ASIAN DEVELOPMENT BANK (CONSULTANCY)
 - DE LA SALLE UNIVERSITY (PART TIME LECTURER)
 - *DEPARTMENT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (CONSULTANCY)
 - *DEPARTMENT OF FINANCE (CONSULTANCY)
 - *DEPARTMENT OF BUDGET AND MANAGEMENT (CONSULTANCY)

THOUGHT EXERCISE



THOUGHT EXERCISE



THOUGHT EXERCISE



- DATA RAW MATERIAL WE INTERPRET
- INFORMATION INTERPRETED DATA IN CONTEXT
- KNOWLEDGE UNDERSTANDING, AWARENESS, COGNIZANCE AND RECOGNITION OF A SITUATION AND FAMILIARITY WITH ITS COMPLEXITY
- EXPLICIT KNOWLEDGE WHAT AN ENTERPRISE OR COMMUNITY ACCEPTS AS TRUE
- TACIT KNOWLEDGE INSIDE THE HEADS OF INDIVIDUALS

+ PATTERNS & TRENDS + RELATIONSHIPS + ASSUMPTIONS

+ DEFINITION + FORMAT + TIME REFERENCE + RELEVANCE

INFORMATION

DATA

SOURCE: DATA MANAGEMENT INTERNATIONAL. DMBOK 2009.

KNOWLEDGE

DATA MANAGEMENT FOCUS ON DEVELOPMENT AND EXECUTION OF PLANS, POLICIES, PRACTICES AND PROJECTS THAT ACQUIRE, CONTROL, PROTECT, DELIVER AND ENHANCE THE VALUE OF DATA

SOURCE: DATA MANAGEMENT INTERNATIONAL. DAMA DICTIONARY OF DATA MANAGEMENT 2011.

INFORMATION MANAGEMENT FOCUS ON:

- ACQUIRING, STORING, AND MAKING ACCESSIBLE INFORMATION TO MAINTAIN ORGANIZATIONAL KNOWLEDGE IN APPROPRIATE INFORMATION RESOURCES
- USING INFORMATION SYSTEMS/INFORMATION TECHNOLOGIES TO SUPPORT KNOWLEDGE EXCHANGES, INTERACTIONS, NEGOTIATIONS, AND FINDING, DIFFUSING AND COMMUNICATING INFORMATION

KNOWLEDGE MANAGEMENT FOCUS ON:

- WHAT THE PEOPLE (WHO MAKE UP THE ORGANIZATIONS) NEED TO KNOW TO ACT SUCCESSFULLY IN THE ORGANIZATION'S INTERESTS
- ACTUAL RESOURCES OF KNOWLEDGE AND SKILL BELONGING TO THE PEOPLE WHO WORK IN AN ORGANIZATION, WHICH COLLECTIVELY CONSTITUTE ITS KNOWLEDGE BASE
- ENSURING THAT THESE RESOURCES ARE MAINTAINED, SAFEGUARDED AND DEVELOPED IN ACCORDANCE WITH THE EMERGING NEEDS OF THE ORGANIZATION

KNOWLEDGE MANAGEMENT IN CONTEXT

KNOWLEDGE MANAGEMENT IS GREATLY INFLUENCED BY THE QUALITY OF DATA AND INFORMATION AVAILABLE TO THE KNOWLEDGE PRACTITIONER

A FUNDAMENTAL UNDERTSTANDING OF DATA MANAGEMENT IS CRITICAL

ORGANIZATIONAL DEVELOPMENT

□ ICT MANAGEMENT

DATA

RE-INTERPRETABLE REPRESENTATION OF INFORMATION IN A FORMALIZED MANNER SUITABLE FOR COMMUNICATION, INTERPRETATION OR PROCESSING (ISO 11179 - METADATA REGISTRY MDR STANDARD)

DATA IS A MEANS OF REPRESENTATION; IT STANDS FOR THINGS OTHER THAN ITSELF (CHISHOLM, 2010)

DATA IS BOTH AN INTERPRETATION OF THE OBJECTS IT REPRESENTS AND AN OBJECT THAT MUST BE INTERPRETED (SEBASTIAN-COLEMAN, 2013)

DATA ASSETS DIFFERENTIATED AGAINST TYPICAL ASSETS

- DATA IS NOT TANGIBLE; YET IT IS DURABLE
- DATA DOES NOT WEAR OUT; THOUGH THE VALUE OF DATA OFTEN CHANGES AS IT AGE
- DATA IS EASY TO COPY AND TRANSPORT; BUT IT IS NOT EASY TO REPRODUCE IF LOST OR DESTROYED
- BECAUSE DATA IS NOT CONSUMED WHEN USED, IT CAN BE STOLEN WITHOUT BEING GONE
- DATA IS DYNAMIC AND CAN BE USED FOR MULTIPLE PURPOSES AND USED AT THE SAME TIME

THE DATA MANAGEMENT ASSOCIATION (DAMA INTERNATIONAL) - DATA MANAGEMENT BODY OF KNOWLEDGE (DAMA DMBOK)

THE DAMA DMBOK IS INTENDED TO BE A DEFINITIVE INTRODUCTION TO DATA MANAGEMENT DAMAA-DABOK

2ND EDITION

AS A DEFINITIVE INTRODUCTION, THE GOALS OF THE DAMA-DMBOK ARE:

- TO BUILD CONSENSUS FOR A GENERALLY APPLICABLE VIEW OF DATA MANAGEMENT FUNCTIONS.
- TO PROVIDE STANDARD DEFINITIONS FOR COMMONLY USED DATA MANAGEMENT FUNCTIONS, DELIVERABLES, ROLES, AND OTHER TERMINOLOGY.
- TO IDENTIFY GUIDING PRINCIPLES FOR DATA MANAGEMENT.
- TO OVERVIEW COMMONLY ACCEPTED GOOD PRACTICES, WIDELY ADOPTED METHODS AND TECHNIQUES, AND SIGNIFICANT ALTERNATIVE APPROACHES, WITHOUT REFERENCE TO SPECIFIC TECHNOLOGY VENDORS OR THEIR PRODUCTS.
- TO BRIEFLY IDENTIFY COMMON ORGANIZATIONAL AND CULTURAL ISSUES.
- TO CLARIFY THE SCOPE AND BOUNDARIES OF DATA MANAGEMENT.
- TO GUIDE READERS TO ADDITIONAL RESOURCES FOR FURTHER UNDERSTANDING.

AUDIENCES FOR THE DAMA-DMBOK INCLUDE:

- CERTIFIED AND ASPIRING DATA MANAGEMENT PROFESSIONALS.
- OTHER IT PROFESSIONALS WORKING WITH DATA MANAGEMENT PROFESSIONALS.
- DATA STEWARDS OF ALL TYPES.
- EXECUTIVES WITH AN INTEREST IN MANAGING DATA AS AN ENTERPRISE ASSET.
- KNOWLEDGE WORKERS DEVELOPING AN APPRECIATION OF DATA AS AN ENTERPRISE ASSET.
- CONSULTANTS ASSESSING AND HELPING IMPROVE CLIENT DATA MANAGEMENT FUNCTIONS.
- EDUCATORS RESPONSIBLE FOR DEVELOPING AND DELIVERING A DATA MANAGEMENT CURRICULUM.
- **RESEARCHERS** IN THE FIELD OF DATA MANAGEMENT.



DAMA-DMBOK2 DATA MANAGEMENT BODY OF KNOWLEDGE

11 KNOWLEDGE AREAS (KAS)



2ND EDITION

DATA GOVERNANCE

DEFINED AS THE EXERCISE OF AUTHORITY AND CONTROL (PLANNING, MONITORING AND ENFORCEMENT) OVER THE MANAGEMENT OF DATA ASSETS

ITS PURPOSE IS TO ENSURE THAT DATA IS MANAGED PROPERLY ACCORDING TO POLICIES AND BEST PRACTICES

IT FOCUSES ON HOW DECISIONS ARE MADE ABOUT DATA AND HOW PEOPLE AND PROCESSES ARE EXPECTED TO BEHAVE IN RELATION TO DATA

DATA GOVERNANCE

USUALLY FOCUSES ON THE FOLLOWING:

POLICY – SETTING AND ENFORCING POLICIES RELATED TO DATA AND METADATA MANAGEMENT, ACCESS, USAGE, SECURITY AND QUALITY

STRATEGY – DEFINING, COMMUNICATING AND DRIVING EXECUTION OF DATA STRATEGY AND DATA GOVERNANCE

STANDARDS AND QUALITY – SETTING AND ENFORCING DATA QUALITY AND DATA ARCHITECTURE STANDARDS

OVERSIGHT – PROVIDING HANDS-ON OBSERVATION, AUDIT AND CORRECTION IN KEY AREAS OF QUALITY, POLICY AND DATA MANAGEMENT (OFTEN REFERRED TO AS STEWARDSHIP)

DATA GOVERNANCE

USUALLY FOCUSES ON THE FOLLOWING:

COMPLIANCE – ENSURING THE ORGANIZATION CAN MEET DATA-RELATED REGULATORY COMPLIANCE REQUIREMENTS

ISSUE MANAGEMENT – IDENTIFYING, DEFINING, ESCALATING AND RESOLVING ISSUES RELATED TO DATA SECURITY, DATA ACCESS, DATA QUALITY, REGULATORY COMPLIANCE, DATA OWNERSHIP, POLICY, STANDARDS, TERMINOLOGY OR DATA GOVERNANCE PROCEDURES

DATA MANAGEMENT PROJECTS – SPONSORING EFFORTS TO IMPROVE DATA MANAGEMENT PRACTICES

DATA ASSET VALUATION – SETTING STANDARDS AND PROCESSES TO CONSISTENTLY DEFINE THE BUSINESS VALUE OF DATA ASSETS

DATA GOVERNANCE IN TEACHER EDUCATION

IDENTIFICATION OF DATA MANAGEMENT PRINCIPLES

DEVELOPMENT AND ENFORCEMENT OF ORGANIZATIONAL POLICIES AND PROCEDURES ON THE USE OF DATA

DATA PRIVACY CONTROLS AND ETHICAL USE OF DATA

OUTLINE OF ROLES AND RESPONSIBILTIES ON DATA MANAGEMENT

DATA ARCHITECTURE

IDENTIFYING THE DATA NEEDS OF THE ENTERPRISE/ORGANIZATION (REGARDLESS OF STRUCTURE) AND DESIGNING AND MAINTAINING THE MASTER BLUEPRINTS TO MEET THOSE NEEDS

USING MASTER BLUEPRINTS TO GUIDE DATA INTEGRATION, CONTROL DATA ASSETS AND ALIGN DATA INVESTMENTS WITH BUSINESS STRATEGY

DATA ARCHITECTURE

DELIVERABLES

ENTERPRISE DATA MODEL (EDM)

- HOLISTIC, ENTERPRISE-LEVEL, IMPLEMENTATION INDEPENDENT CONCEPTUAL OR LOGICAL DATA MODEL PROVIDING A COMMON CONSISTENT VIEW OF DATA ACROSS THE ENTERPRISE
- INCLUDES BUSINESS CONCEPTS, THEIR RELATIONSHIPS, CRITICAL GUIDING BUSINESS RULES AND SOME CRITICAL ATTRIBUTES

DATA FLOW DESIGN

- DEFINES THE REQUIREMENTS AND MASTER BLUEPRINT FOR STORAGE AND PROCESSING ACROSS DATABASES, APPLICATIONS, PLATFORMS AND NETWORKS
- MAPS THE MOVEMENT OF DATA TO BUSINESS PROCESSES, LOCATIONS, BUSINESS ROLES AND TO TECHNICAL COMPONENTS

DATA ARCHITECTURE

FACTORS TO CONSIDER WHEN ADOPTING DATA ARCHITECTURE PRACTICES

- CULTURAL RECEPTIVITY TO ARCHITECTURAL APPROACH (DEVELOPING AN ARCHITECTURE-FRIENDLY CULTURE)
- ORGANIZATIONAL RECOGNITION OF DATA AS A BUSINESS ASSET, NOT JUST AN IT CONCERN
- ORGANIZATIONAL ABILITY TO LET GO OF A LOCAL PERSPECTIVE AND ADOPT AN ENTERPRISE PERSPECTIVE ON DATA
- ORGANIZATIONAL ABILITY TO INTEGRATE ARCHITECTURAL DELIVERABLES INTO PROJECT METHODOLOGY
- LEVEL OF ACCEPTANCE OF FORMAL DATA GOVERNANCE
- ABILITY TO LOOK HOLISTICALLY AT THE ENTERPRISE, RATHER THAN BEING FOCUSED ON PROJECT DELIVERY AND IT SOLUTIONING

DATA ARCHITECTURE IN TEACHER EDUCATION

ASSESSMENT OF HOW DATA WILL BE ORGANIZED

DEVELOPMENT OF FLOW CHARTS AND DIAGRAMS ON THE USE AND MANAGEMENT OF DATA

TECHNOLOGY AGNOSTIC VIEW OF HOW DATA SHOULD BE MANAGED

PROCESS OF DISCOVERING, ANALYZING AND SCOPING DATA REQUIREMENTS

REPRESENTING AND COMMUNICATING THE DATA REQUIREMENTS IN A PRECISE FORM CALLED THE DATA MODEL

THIS PROCESS IS ITERATIVE AND MAY INCLUDE A CONCEPTUAL, LOGICAL AND PHYSICAL MODEL

DELIVERABLES

DATA MODEL DIAGRAM

- CAN BE ONE OR MORE DIAGRAMS
- DEPICTS A LEVEL OF DETAIL (E.G. CONCEPTUAL, LOGICAL OR PHYSICAL)
- DEPICTS A SCHEME (E.G. RELATIONAL, DIMENSIONAL, OBJECT ORIENTED, FACT BASED, TIME BASED OR NOSQL)
- USES A NOTATION (E.G. INFORMATION ENGINEERING, UNIFIED MODELING LANGUAGE, OBJECT-ROLE MODELING)

DEFINITIONS

- ENTITIES
- ATTRIBUTES
- **RELATIONSHIPS**

A DATA MODEL DESCRIBES AN ORGANIZATION'S DATA AS THE ORGANIZATION UNDERSTANDS IT, OR AS THE ORGANIZATION WANTS IT TO BE

THE MODEL IS A FORM OF DOCUMENTATION FOR DATA REQUIREMENTS AND DATA DEFINITIONS

DATA MODELS ARE THE MAIN MEDIUM USED TO COMMUNICATE DATA REQUIREMENTS FROM BUSINESS TO IT AND WITHIN IT FROM ANALYSTS, MODELERS AND ARCHITECTS TO DATABASE DESIGNERS AND DEVELOPERS

ENTITIES

CATEGORY	DEFINITION	EXAMPLES
WHO	PERSON OR ORGANIZATION OF INTEREST. THAT IS, WHO IS IMPORTANT TO THE BUSINESS? OFTEN A 'WHO' IS ASSOCIATED WITH A PARTY GENERALIZATION, OR ROLE SUCH AS CUSTOMER OR VENDOR. PERSONS OR ORGANIZATIONS CAN HAVE MULTIPLE ROLES OR BE INCLUDED IN MULTIPLE PARTIES.	EMPLOYEE, PATIENT, PLAYER, SUSPECT, CUSTOMER, VENDOR, STUDENT, PASSENGER, COMPETITOR, AUTHOR
WHAT	PRODUCT OR SERVICE OF INTEREST TO THE ENTERPRISE. IT OFTEN REFERS TO WHAT THE ORGANIZATION MAKES OR WHAT SERVICE IT PROVIDES. THAT IS, WHAT IS IMPORTANT TO THE BUSINESS? ATTRIBUTES FOR CATEGORIES, TYPES, ETC. ARE VERY IMPORTANT HERE.	PRODUCT, SERVICE, RAW MATERIAL, FINISHED GOOD, COURSE, SONG, PHOTOGRAPH, BOOK
WHEN	CALENDAR OR TIME INTERVAL OF INTEREST TO THE ENTERPRISE. THAT IS, WHEN IS THE BUSINESS IN OPERATION?	TIME, DATE, MONTH, QUARTER, YEAR, CALENDAR, SEMESTER, FISCAL PERIOD, MINUTE, DEPARTURE TIME

ENTITIES

CATEGORY	DEFINITION	EXAMPLES
WHERE	LOCATION OF INTEREST TO THE ENTERPRISE. LOCATION CAN REFER TO ACTUAL PLACES AS WELL AS ELECTRONIC PLACES. THAT IS, WHERE IS BUSINESS CONDUCTED?	MAILING ADDRESS, DISTRIBUTION POINT, WEBSITE URL, IP ADDRESS
WHY	EVENT OR TRANSACTION OF INTEREST TO THE ENTERPRISE. THESE EVENTS KEEP THE BUSINESS AFLOAT. THAT IS, WHY IS THE BUSINESS IN BUSINESS?	ORDER, RETURN, COMPLAINT, WITHDRAWAL, DEPOSIT, COMPLIMENT, INQUIRY, TRADE, CLAIM
ноw	DOCUMENTATION OF THE EVENT OF INTEREST TO THE ENTERPRISE. DOCUMENTS PROVIDE THE EVIDENCE THAT THE EVENTS OCCURRED, SUCH AS A PURCHASE ORDER RECORDING AN ORDER EVENT. THAT IS, HOW DO WE KNOW THAT AN EVENT OCCURRED?	INVOICE, CONTRACT, AGREEMENT, ACCOUNT, PURCHASE ORDER, SPEEDING TICKET, PACKING SLIP, TRADE CONFIRMATION
MEASUREMENT	COUNTS, SUMS, ETC. OF THE OTHER CATEGORIES (WHAT, WHERE) AT OR OVER POINTS IN TIME (WHEN).	SALES, ITEM COUNT, PAYMENTS, BALANCE

DATA MODELING EXAMPLE

These cardinality symbols are illustrated in the following information engineering example of **Student** and **Course**.



Figure 31 Cardinality Symbols

The business rules are:

- Each Student may attend one or many Courses.
- Each Course may be attended by one or many Students.

DATA MODELING EXAMPLE



DATA MODELING EXAMPLE



DATA MODELING AND DESIGN IN TEACHER EDUCATION

- DEVELOPMENT OF DIAGRAMS ON HOW DATA RELATES WITH ONE ANOTHER
- TECHNOLOGY AGNOSTIC VIEW OF HOW DATA SHOULD BE ORGANIZED
- IDENTIFY WHICH DATA ARE CATEGORIES AND FILTERS (DIMENSIONS) VERSUS DATA THAT ARE ADDITIVE IN BEHAVIOR (MEASURES)
- ITERATIVE PROCESS THAT WOULD IDENTIFY POINTS FOR DATA INTEGRATION AND INTEROPERABILITY VIA COMMON DATA ACROSS VARIOUS SOURCES

DATA STORAGE AND OPERATIONS

MANAGE AVAILABILITY OF DATA THROUGHOUT THE DATA LIFECYCLE ENSURE THE INTEGRITY OF DATA ASSETS MANAGE PERFORMANCE OF DATA TRANSACTIONS
DATA STORAGE AND OPERATIONS

CENTRALIZED

- HAVE ALL THE DATA IN ONE SYSTEM IN ONE
 PLACE
- ALL USERS COME TO THE ONE SYSTEM TO ACCESS
 THE DATA
- IDEAL FOR CERTAIN RESTRICTED DATA
- RISK OF UNAVAILABILITY DUE TO SINGLE POINT OF FAILURE WITH NO REDUNDANCY



DATA STORAGE AND OPERATIONS

DISTRIBUTED

- FACILITATE QUICK ACCESS TO DATA OVER A LARGE NUMBER OF NODES
- MOSTLY ALLOWS THE DATA MANAGEMENT SOFTWARE TO REPLICATE DATA AMONG SERVERS HARDWARE REPLICATION ALSO POSSIBLE
- INCREASED NETWORK MANAGEMENT AND OVERHEAD DUE TO INCREASED NETWORK TRAFFIC
- INCREASED STORAGE MANAGEMENT OVERHEAD DUE TO SOME DUPLICATION OF DATA ACROSS NODES

Distributed, not Federated



DATA STORAGE AND OPERATIONS

FEDERATED

- **REDUCED DUPLICATION OF DATA**
- ALLOWS PARTIAL AND CONTROLLED
 SHARING OF DATA OVER THE
 NETWORK
- CONSIDERS DISPARATE DATABASES AS
 ONE LARGE OBJECT
- ALTERNATIVE TO MERGING DISPARATE
 DATABASES



DATA STORAGE AND OPERATIONS IN TEACHER EDUCATION

IDENTIFY APPROPRIATE STORAGE STRATEGY GIVEN RESOURCES AND CONSTRAINTS

ANTICIPATE RISKS AND POTENTIAL IMPACT TO DATA PROCESSING SPREADSHEETS VERSUS DATABASES

PLANNING, DEVELOPMENT AND EXECUTION OF SECURITY POLICIES AND PROCEDURES TO PROVIDE PROPER AUTHENTICATION, AUTHORIZATION, ACCESS AND AUDITING OF DATA AND INFORMATION ASSETS

VULNERABILITY IS A WEAKNESS OF DEFECT IN A SYSTEM THAT ALLOWS IT TO BE SUCCESSFULLY ATTACKED AND COMPROMISED (I.E. A HOLE IN AN ORGANIZATION'S DEFENSES); SOME ARE CALLED EXPLOITS

THREAT IS A POTENTIAL OFFENSIVE ACTION THAT COULD BE TAKEN AGAINST AN ORGANIZATION; CAN BE INTERNAL OR EXTERNAL; THEY ARE NOT ALWAYS MALICIOUS

RISK REFERS BOTH TO THE POSSIBILITY OF LOSS AND TO THE THING OR CONDITION THAT POSES THE POTENTIAL LOSS. **R**ISK CAN BE CALCULATED FOR EACH POSSIBLE THREAT USING THE FOLLOWING FACTORS:

- PROBABILITY THAT THE THREAT WILL OCCUR AND ITS LIKELY FREQUENCY
- THE TYPE AND AMOUNT OF DAMAGE EACH OCCURRENCE MIGHT CAUSE, INCLUDING DAMAGE TO REPUTATION
- THE EFFECT DAMAGE WILL HAVE ON REVENUE OR BUSINESS OPERATIONS
- THE COST TO FIX THE DAMAGE AFTER AN OCCURRENCE
- THE COST TO PREVENT THE THREAT, INCLUDING BY REMEDIATION OF VULNERABILITIES
- THE GOAL OR INTENT OF THE PROBABLE ATTACKER

DATA INTEGRITY IS THE STATE OF BEING WHOLE – PROTECTED FROM IMPROPER ALTERATION, DELETION OR ADDITION.

ENCRYPTION IS THE PROCESS OF TRANSLATING PLAIN TEXT INTO COMPLEX CODES TO HIDE PRIVILEGED INFORMATION, VERIFY COMPLETE TRANSMISSION OR VERIFY SENDER'S IDENTITY.

OBFUSCATION OR MASKING IS WHERE DATA CAN BE MADE LESS AVAILABLE BY OBFUSCATION (MAKING OBSCURE OR UNCLEAR) OR MASKING, WHICH REMOVES, SHUFFLES OR OTHERWISE CHANGES THE APPEARANCE OF THE DATA, WITHOUT LOSING THE MEANING OF THE DATA OR THE RELATIONSHIPS THE DATA HAS TO OTHER DATA SETS.

DATA CONFIDENTIALITY RANGES FROM HIGH TO LOW

FOR GENERAL AUDIENCES INFORMATION AVAILABLE TO EVERYONE, INCLUDING THE PUBLIC.

INTERNAL USE ONLY INFORMATION LIMITED TO EMPLOYEES OR MEMBERS, BUT WITH MINIMAL RISK IF SHARED. INTERNAL USE ONLY, MAY BE SHOWN OR DISCUSSED, BUT NOT COPIED, OUTSIDE OF THE ORGANIZATION.

CONFIDENTIAL INFORMATION THAT CANNOT BE SHARED OUTSIDE THE ORGANIZATION WITHOUT A PROPERLY EXECUTED NON-DISCLOSURE AGREEMENT OR SIMILAR IN PLACE

RESTRICTED CONFIDENTIAL INFORMATION LIMITED TO INDIVIDUALS PERFORMING CERTAIN ROLES WITH THE "NEED TO KNOW". USUALLY REQUIRES CLEARANCES.

REGISTERED CONFIDENTIAL INFORMATION SO CONFIDENTIAL THAT ANYONE ACCESSING THE INFORMATION MUST SIGN A LEGAL AGREEMENT TO ACCESS THE DATA AND ASSUME RESPONSIBILITY FOR ITS SECRECY.

DATA SECURITY IN TEACHER EDUCATION

ASSESS DATA CONFIDENTIALITY SCORES FOR ALL DATA YOU MANAGE, PROCESS AND STORE (INCLUDING ARCHIVES AND BACKUPS)

IDENTIFY APPROPRIATE USER ACCESS CONTROLS FROM THE RESULTS OF THE DATA ASSESSMENTS

ADOPT PRIVACY BY DESIGN APPROACH TO DATA MANAGEMENT

MANAGING THE MOVEMENT AND CONSOLIDATION OF DATA WITHIN AND BETWEEN APPLICATIONS AND ORGANIZATIONS

EXTRACT, TRANSFORM AND LOAD (ETL) EXTRACT

IDENTIFICATION OF SOURCE DATA ESTABLISH PERMISSIONS AND SECURE ACCESS TRANSFORM

FORMAT CHANGES STRUCTURE CHANGES SEMANTIC CONVERSION DE-DUPING RE-ORDERING

LOAD

PHYSICAL STORING OF RESULT IN TARGET SYSTEM



BATCH PROCESSING

MOST DATA MOVES BETWEEN APPLICATIONS AND ORGANIZATIONS IN CLUMPS OR FILES.

DATA MOVING IN BATCH PROCESSING WILL REPRESENT EITHER THE FULL SET OF DATA AT A GIVEN POINT IN TIME OR DATA THAT HAS CHANGED VALUES SINCE THE LAST TIME THE DATA WAS SENT

THE SET OF CHANGED DATA IS CALLED THE DELTA THE DATA FROM A POINT IN TIME IS CALLED A SNAPSHOT

LATENCY

THE TIME DIFFERENCE BETWEEN WHEN DATA IS GENERATED IN THE SOURCE SYSTEM AND WHEN THE DATA IS AVAILABLE FOR USE IN THE TARGET SYSTEM

LATENCY CAN BE: HIGH(BATCH) LOW (EVENT-DRIVEN) VERY LOW (REAL-TIME SYNCHRONOUS)

DATA INTEGRATION AND INTEROPERABILITY IN TEACHER EDUCATION

- IDENTIFY MERITS FOR MANUAL OR AUTOMATED DATA FLOWS ESTABLISH PROCEDURES AND STRATEGIES FOR DATA SYNCHRONIZATION
- JUSTIFY THE NEED FOR "REAL TIME" DATA REAL TIME DATA VERSUS RESPONSIVE DATA

PLANNING, IMPLEMENTATION AND CONTROL ACTIVITIES FOR LIFECYCLE MANAGEMENT OF DATA AND INFORMATION IN ANY FORM OR MEDIUM

DOCUMENTS ARE ELECTRONIC OR PAPER OBJECTS THAT CONTAIN INSTRUCTIONS FOR TASKS, REQUIREMENTS FOR HOW AND WHEN TO PERFORM A TASK OR FUNCTION AND LOGS OF TASK EXECUTION AND DECISIONS.

RECORDS PROVIDE EVIDENCE THAT ACTIONS WERE TAKEN AND DECISIONS WERE MADE IN KEEPING WITH PROCEDURES. THEY CAN SERVE AS EVIDENCE OF THE ORGANIZATION'S BUSINESS ACTIVITIES AND REGULATORY COMPLIANCE.

TAXONOMY

USED TO COVER A RANGE OF TOOLS AND TECHNOLOGICAL SOLUTIONS FOR PUTTING CONCEPTS RELEVANT TO THE WORK OF ORGANIZATIONS INTO 'FAMILY' GROUPS, CATEGORIES, AND HIERARCHIES, IN ORDER TO HELP IN MANAGING LARGE STORES OF INFORMATION (ORNA, 2004)

THE TAXONOMY TOOLS ARE DESIGNED TO TAKE ADVANTAGE OF THE HUMAN TENDENCIES TO GROUP AND NAME, AND TO OVERCOME OUR INCONSISTENCIES IN DOING IT, BY HELPING US TO SET STANDARDS FOR:

- GROUPING OUR IDEAS ABOUT WHATEVER WE NEED TO KNOW ABOUT (CLASSIFICATIONS)
- PROVIDING POINTERS TO THE ACTUAL CONTENT OF ITEMS AND COLLECTIONS OF ITEMS (INDEXES)
- NAMING THE SUBJECTS AND OBJECTS THAT MAKE UP THE INFORMATION CONTENT WE NEED TO MAINTAIN OUR KNOWLEDGE (THESAURI)
- LABELLING THE DIFFERENT KINDS OF 'CONTAINERS' INTO WHICH WE PUT THE INFORMATION (METADATA)

DOCUMENT AND CONTENT MANAGEMENT IN TEACHER EDUCATION

- IDENTIFY TECHNIQUES FOR ORGANIZING AND GROUPING DATA ENSURE SEMANTIC CONSISTENCIES
- CATEGORIES AND CLASSIFICATIONS MUST BE SIMPLE YET DEFINITIVE

REFERENCE AND MASTER DATA

MANAGING SHARED DATA TO MEET ORGANIZATIONAL GOALS, REDUCE RISK ASSOCIATED WITH DATA REDUNDANCY, ENSURE HIGHER QUALITY AND REDUCE THE COSTS OF DATA INTEGRATION

REFERENCE AND MASTER DATA

MASTER DATA REQUIRES IDENTIFYING AND/OR DEVELOPING A TRUSTED VERSION OF TRUTH FOR EACH INSTANCE OF CONCEPTUAL ENTITIES SUCH AS PRODUCT, PLACE, ACCOUNT, PERSON OR ORGANIZATION AND MAINTAINING THE CURRENCY OF THAT VERSION

MAIN CHALLENGE IS ON ENTITY RESOLUTION (AKA IDENTITY MANAGEMENT) WHICH IS THE PROCESS OF DISCERNING AND MANAGING ASSOCIATIONS BETWEEN DATA FROM DIFFERENT SYSTEMS AND PROCESSES

WORKS TO RESOLVE THESE DIFFERENCES IN ORDER TO CONSISTENTLY IDENTIFY INDIVIDUAL ENTITY INSTANCES IN DIFFERENT CONTEXTS AND MUST BE MANAGED OVER TIME

REFERENCE AND MASTER DATA

TRUSTED SOURCE IS RECOGNIZED AS THE 'BEST VERSION OF THE TRUTH' BASED ON A COMBINATION OF AUTOMATED RULES AND MANUAL STEWARDSHIP OF DATA CONTENT

MAY ALSO BE REFERRED TO AS A "SINGLE VIEW" OR "360° VIEW"

WITHIN A TRUSTED SOURCE, RECORDS THAT REPRESENT THE MOST ACCURATE DATA ABOUT ENTITY INSTANCES CAN BE REFERRED TO AS "GOLDEN RECORDS"

MERGING/RESOLUTION OF DATA FROM MULTIPLE SOURCES INTO A "GOLDEN RECORD" DOES NOT MEAN THAT IT IS ALWAYS A 100% COMPLETE AND 100% ACCURATE REPRESENTATION OF ALL THE ENTITIES WITHIN THE ORGANIZATION

REFERENCE AND MASTER DATA IN TEACHER EDUCATION

- IDENTIFY PROCESSES AND PROCEDURES WHEN DEVELOPING MASTERLISTS OF DATA
- AGREEMENT BETWEEN STAKEHOLDERS ON HOW TO DEFINE UNIQUE RECORDS AND IDENTIFIERS BETWEEN AND ACROSS SPREADSHEETS, DATABASES AND SYSTEMS

DATA WAREHOUSING AND BUSINESS INTELLIGENCE

PLANNING, IMPLEMENTATION AND CONTROL PROCESSES TO PROVIDE DECISION SUPPORT DATA AND SUPPORT KNOWLEDGE WORKERS ENGAGED IN REPORTING, QUERY AND ANALYSIS

DATA WAREHOUSING AND BUSINESS INTELLIGENCE

DATA WAREHOUSE IS AN INTEGRATED DECISION SUPPORT DATABASE. ALTERNATIVELY, IT IS ALSO THE RELATED SOFTWARE PROGRAMS USED TO COLLECT, CLEANSE, TRANSFORM AND STORE DATA FROM A VARIETY OF OPERATIONAL AND EXTERNAL SOURCES.

DATA WAREHOUSING DESCRIBES THE OPERATIONAL EXTRACT, CLEANSING, TRANSFORMATION, CONTROL AND LOAD PROCESSES THAT MAINTAIN THE DATA IN THE DATA WAREHOUSE. THIS PROCESSES FOCUSES ON ENABLING AN INTEGRATED AND HISTORICAL BUSINESS CONTEXT ON OPERATIONAL DATA BY ENFORCING BUSINESS RULES AND MAINTAINING APPROPRIATE BUSINESS DATA RELATIONSHIPS.

DATA WAREHOUSING AND BUSINESS INTELLIGENCE

BUSINESS INTELLIGENCE REFERS TO A TYPE OF DATA ANALYSIS AIMED AT UNDERSTANDING ORGANIZATIONAL ACTIVITIES AND OPPORTUNITIES. ALTERNATIVELY, IT ALSO REFERS TO A SET OF TECHNOLOGIES THAT SUPPORT THE KIND OF ANALYSIS MENTIONED.

BI TOOLS ENABLE QUERYING, DATA MINING, STATISTICAL ANALYSIS, REPORTING, SCENARIO MODELING, DATA VISUALIZATION AND DASHBOARDING.

DATA WAREHOUSING AND BUSINESS INTELLIGENCE IN TEACHER EDUCATION

- DISCUSS MOTIVATIONS FOR STORING AND PROCESSING HISTORICAL DATA
- REPORTS AND DASHBOARDS VIA READ ON DATA DEVELOP IF USE CASE IS FOR DEEP ANALYSIS AND ARTIFICIAL INTELLIGENCE

METADATA

PLANNING, IMPLEMENTATION AND CONTROL ACTIVITIES TO ENABLE ACCESS TO HIGH QUALITY AND INTEGRATED METADATA

METADATA

PLANNING, IMPLEMENTATION AND CONTROL ACTIVITIES TO ENABLE ACCESS TO HIGH QUALITY AND INTEGRATED METADATA

METADATA IS DATA ABOUT DATA. THIS ENCOMPASSES INFORMATION ABOUT TECHNICAL AND BUSINESS PROCESSES, DATA RULES AND CONSTRAINTS, AS WELL AS LOGICAL AND PHYSICAL DATA STRUCTURES.

METADATA

DATA DICTIONARY (BUSINESS GLOSSARY)

ANY PLACE WHERE BUSINESS AND/OR TECHNICAL TERMS AND DEFINITIONS ARE STORED. TYPICALLY, DATA DICTIONARIES ARE DESIGNED TO STORE A LIMITED SET OF AVAILABLE META-DATA, CONCENTRATING ON THE NAMES AND DEFINITIONS RELATING TO THE PHYSICAL DATA AND RELATED OBJECTS OF SYSTEMS IMPLEMENTED OR IN DEVELOPMENT.

THE DATA DICTIONARY IS A REGISTRY OF DATA ELEMENTS AND DEFINITIONS. IT IS THE AUTHORITATIVE DOCUMENT CONTAINING THE STANDARD NAMES AND DEFINITIONS OF AVAILABLE DATA SETS OF THE DEPARTMENT. THIS DOCUMENT MUST CONTAIN OTHER METADATA AND SERVE AS A SINGLE POINT OF REFERENCE FOR EXECUTIVE, MANAGEMENT, TECHNICAL AND EXTERNAL DATA USERS.

METADATA IN TEACHER EDUCATION

METADATA PROVIDES CONTEXT TO DATA, THEREBY MAKING IT CRITICAL FOR DATA INTERPRETATION

DATA DICTIONARY FACILITATES PRELIMINARY DATA SHARING EXERCISES WITHOUT TRANSFERRING TO ACTUAL/RAW DATA

PLANNING, IMPLEMENTATION AND CONTROL ACTIVITIES THAT APPLY QUALITY MANAGEMENT TECHNIQUES TO DATA IN ORDER TO ASSURE IT IS FIT FOR CONSUMPTION AND MEETS THE NEEDS OF DATA CONSUMERS

- THE DEGREE TO WHICH DATA IS ACCURATE, COMPLETE, TIMELY, CONSISTENT WITH ALL REQUIREMENTS AND BUSINESS RULES, AND RELEVANT FOR A GIVEN USE.
- DATA QUALITY IS SYNONYMOUS WITH INFORMATION QUALITY, SINCE POOR DATA QUALITY RESULTS IN INACCURATE INFORMATION AND POOR BUSINESS PERFORMANCE.
- DATA CLEANSING MAY RESULT IN SHORT-TERM AND COSTLY IMPROVEMENTS THAT DO NOT ADDRESS THE ROOT CAUSES OF DATA DEFECTS.
- A MORE RIGOROUS DATA QUALITY PROGRAM IS NECESSARY TO PROVIDE AN ECONOMIC SOLUTION TO IMPROVED DATA QUALITY AND INTEGRITY.

DATA PROFILING

FORM OF DATA ANALYSIS USED TO INSPECT DATA AND ASSESS QUALITY

USES STATISTICAL TECHNIQUES TO DISCOVER THE TRUE STRUCTURE, CONTENT AND QUALITY OF A COLLECTION OF DATA

PRODUCES STATISTICS THAT ANALYSTS CAN USE TO IDENTIFY PATTERNS IN DATA CONTENT AND STRUCTURE

- Counts of nulls: Identifies nulls exist and allows for inspection of whether they are allowable or not
- Max/Min value: Identifies outliers, like negatives
- Max/Min length: Identifies outliers or invalids for fields with specific length requirements
- Frequency distribution of values for individual columns: Enables assessment of reasonability (e.g., distribution of country codes for transactions, inspection of frequently or infrequently occurring values, as well as the percentage of the records populated with defaulted values)
- Data type and format: Identifies level of non-conformance to format requirements, as well as
 identification of unexpected formats (e.g., number of decimals, embedded spaces, sample values)

DATA CLEANSING

ALSO KNOWN AS SCRUBBING

TRANSFORMS DATA TO MAKE IT CONFORM TO STANDARDS AND DOMAIN RULES

INCLUDES DETECTING AND CORRECTING DATA ERRORS TO BRING THE QUALITY OF DATA TO AN ACCEPTANCE LEVEL

COSTS MONEY AND INTRODUCES RISKS TO CONTINUOUSLY REMEDIATE DATA THROUGH CLEANSING

IDEALLY, THE NEED FOR DATA CLEANSING SHOULD DECREASE OVER TIME, AS ROOT CAUSES OF DATA ISSUES ARE RESOLVED
DATA QUALITY IN TEACHER EDUCATION

RESOLVE DATA QUALITY ISSUES AT ITS ROOT CAUSE DATA CLEANSING SHOULD BE TEMPORARY DATA QUALITY IS ALSO MEASURED AS A FUNCTION OF TIME QUALITY OF DATA MAY CHANGE OVER TIME GIVEN CERTAIN CONTEXTS

SELECTED TRENDS AND INNOVATIONS

OPEN DATA INITIATIVES



SELECTED TRENDS AND INNOVATIONS

SOCIAL MEDIA AND CROWDSOURCING PLATFORMS

Social Media Landscape 2018



SELECTED TRENDS AND INNOVATIONS

RISE OF BIG DATA AND ARTIFICIAL INTELLIGENCE



IN SUMMARY



DANAGEMENT BODY OF KNOWLEDGE

2ND EDITION

SOURCE: DATA MANAGEMENT INTERNATIONAL. DMBOK 2009.

IN SUMMARY

- DISCUSSED ALIGNMENT AND RELATIONSHIPS BETWEEN KNOWLEDGE
 MANAGEMENT AND DATA MANAGEMENT
- PROVIDED AN INTRODUCTORY SESSION ON VARIOUS MATTERS ABOUT DATA MANAGEMENT VIEWED FROM DIFFERENT PERSPECTIVES
- INTRODUCED A DATA MANAGEMENT FRAMEWORK BASED FROM LITERATURE STUDIES AND EMERGING PRACTICES
- FRAMEWORK AS A "WAY-OF-THINKING"
- COMPARTMENTALIZATION OF ISSUES AND DISSECTING
 INTERDEPENDENCIES
- PROVIDING A NEUTRAL FRAMEWORK THAT CAN BE APPLIED IN VARIOUS
 SECTORS/INDUSTRIES

INFORMATION AND KNOWLEDGE MANAGEMENT IN TEACHER EDUCATION

END OF PRESENTATION