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INFORMATICS PROFESSIONALS. LEADING THE WAY.

5C: Building Effective Healthcare IT Teams
Effective Communications

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Clinical Informatics
Board Review Course

Clinical Informatics Subspecialty Delineation of Practice (CIS DoP)

Domain 1: Fundamental Knowledge and Skills (no Tasks are associated with this Domain which is focused on fundamental knowledge and skills)

Clinical Informatics

K001. The discipline of informatics (e.g., definitions, history, careers, professional organizations)
K002. Fundamental informatics concepts, models, and theories
K003. Core clinical informatics literature (e.g., foundational literature, principle journals, critical analysis of literature, use of evidence to inform practice)
K004. Descriptive and inferential statistics
K005. Health Information Technology (HIT) principles and science
K006. Computer programming fundamentals and computational thinking
K007. Basic systems and network architectures
K008. Basic database structure, data retrieval and analytics techniques and tools
K009. Development and use of interoperability/exchange standards (e.g., Fast Health Interoperability Resources [FHIR], Digital Imaging and Communications in Medicine [DICOM])
K010. Development and use of transaction standards (e.g., American National Standards Institute X12)
K011. Development and use of messaging standards (e.g., Health Level Seven [HL7] v2)
K012. Development and use of ancillary data standards (e.g., imaging and Laboratory Information System[LIS])
K013. Development and use of data model standards
K014. Vocabularies, terminologies, and nomenclatures (e.g., Logical Observation Identifiers Names and Codes [LOINC], Systematized Nomenclature of Medicine --Clinical Terms [SNOMED-CT], RxNorm, International Classification Of Diseases[ICD], Current Procedural Terminology [CPT])
K015. Data taxonomies and ontologies
K016. Security, privacy, and confidentiality requirements and practices
K017. Legal and regulatory issues related to clinical data and information sharing
K018. Technical and non-technical approaches and barriers to interoperability
K019. Ethics and professionalism

The Health System

K020. Primary domains of health, organizational structures, cultures, and processes (e.g., health care delivery, public health, personal health, population health, education of health professionals, clinical research)
K021. Determinants of individual and population health
K022. Forces shaping health care delivery and considerations regarding health care access
K023. Health economics and financing
K024. Policy and regulatory frameworks related to the healthcare system
K025. The flow of data, information, and knowledge within the health system

Domain 2: Improving Care Delivery and Outcomes

K026. Decision science (e.g., Bayes theorem, decision analysis, probability theory, utility and preference assessment, test characteristics)
K027. Clinical decision support standards and processes for development, implementation, evaluation, and maintenance
K028. Five Rights of clinical decision support (i.e., information, person, intervention formats, channel, and point/time in workflow)
K029. Legal, regulatory, and ethical issues regarding clinical decision support
K030. Methods of workflow analysis
K031. Principles of workflow re-engineering
K032. Quality improvement principles and practices (e.g., Six Sigma, Lean, Plan-Do-Study-Act [PDSA] cycle, root cause analysis)
K033. User-centered design principles (e.g., iterative design process)
K034. Usability testing
K035. Definitions of measures (e.g., quality performance, regulatory, pay for performance, public health surveillance)
K036. Measure development and evaluation processes and criteria
K037. Key performance indicators (KPIs)
K038. Claims analytics and benchmarks
K039. Predictive analytic techniques, indications, and limitations
K040. Clinical and financial benchmarking sources (e.g., Gartner, Healthcare Information and Management Systems Society [HIMSS] Analytics, Centers for Medicare and Medicaid Services [CMS], Leapfrog)
K041. Quality standards and measures promulgated by quality organizations (e.g., National Quality Forum [NQF], Centers for Medicare and Medicaid Services [CMS], National Committee for Quality Assurance [NCQA])
K042. Facility accreditation quality and safety standards (e.g., The Joint Commission, Clinical Laboratory Improvement Amendments [CLIA])
K043. Clinical quality standards (e.g., Physician Quality Reporting System [PQRS], Agency for Healthcare Research and Quality [AHRQ], National Surgical Quality Improvement Program [NSQIP], Quality Reporting Document Architecture [QRDA], Health Quality Measure Format [HQMF], Council on Quality and Leadership [CQL], Fast Health Interoperability Resources [FHIR] Clinical Reasoning)
K044. Reporting requirements
K045. Methods to measure and report organizational performance
K046. Adoption metrics (e.g., Electronic Medical Records Adoption Model [EMRAM], Adoption Model for Analytics Maturity [AMAM])
K047. Social determinants of health
K048. Use of patient-generated data
K049. Prediction models
K050. Risk stratification and adjustment
K051. Concepts and tools for care coordination
K052. Care delivery and payment models

Domain 3: Enterprise Information Systems

K053. Health information technology landscape (e.g., innovation strategies, emerging technologies)
K054. Institutional governance of clinical information systems
K055. Information system maintenance requirements
K056. Information needs analysis and information system selection
K057. Information system implementation procedures
K058. Information system evaluation techniques and methods
K059. Information system and integration testing techniques and methodologies
K060. Enterprise architecture (databases, storage, application, interface engine)
K061. Methods of communication between various software components
K062. Network communications infrastructure and protocols between information systems (e.g., Transmission Control Protocol/Internet Protocol [TCP/IP], switches, routers)
K063. Types of settings (e.g., labs, ambulatory, radiology, home) where various systems are used
K064. Clinical system functional requirements
K065. Models and theories of human-computer (machine) interaction (HCI)
K066. HCI evaluation, usability engineering and testing, study design and methods
K067. HCI design standards and design principles
K068. Functionalities of clinical information systems (e.g., Electronic Health Records [EHR], Laboratory Information System [LIS], Picture Archiving and Communication System [PACS], Radiology Information System [RIS] vendor-neutral archive, pharmacy, revenue cycle)
K069. Consumer-facing health informatics applications (e.g., patient portals, mobile health apps and devices, disease management, patient education, behavior modification)
K070. User types and roles, institutional policy and access control
K071. Clinical communication channels and best practices for use (e.g., secure messaging, closed loop communication)
K072. Security threat assessment methods and mitigation strategies
K073. Security standards and safeguards
K074. Clinical impact of scheduled and unscheduled system downtimes
K075. Information system failure modes and downtime mitigation strategies (e.g., replicated data centers, log shipping)
K076. Approaches to knowledge repositories and their implementation and maintenance
K077. Data storage options and their implications
K078. Clinical registries
K079. Health information exchanges
K080. Patient matching strategies
K081. Master patient index
K082. Data reconciliation
K083. Regulated medical devices (e.g., pumps, telemetry monitors) that may be integrated into information systems
K084. Non-regulated medical devices (e.g., consumer devices)
K085. Telehealth workflows and resources (e.g., software, hardware, staff)

Domain 4: Data Governance and Data Analytics

K086. Stewardship of data
K087. Regulations, organizations, and best practice related to data access and sharing agreements, data use, privacy, security, and portability
K088. Metadata and data dictionaries
K089. Data life cycle
K090. Transactional and reporting/research databases
K091. Techniques for the storage of disparate data types
K092. Techniques to extract, transform, and load data
K093. Data associated with workflow processes and clinical context
K094. Data management and validation techniques
K095. Standards related to storage and retrieval from specialized and emerging data sources
K096. Types and uses of specialized and emerging data sources (e.g., imaging, bioinformatics, internet of things (IoT), patient-generated, social determinants)
K097. Issues related to integrating emerging data sources into business and clinical decision making
K098. Information architecture
K099. Query tools and techniques
K100. Flat files, relational and non-relational/NoSQL database structures, distributed file systems
K101. Definitions and appropriate use of descriptive, diagnostic, predictive, and prescriptive analytics
K102. Analytic tools and techniques (e.g., Boolean, Bayesian, statistical/mathematical modeling)
K103. Advanced modeling and algorithms
K104. Artificial intelligence
K105. Machine learning (e.g., neural networks, support vector machines, Bayesian network)
K106. Data visualization (e.g., graphical, geospatial, 3D modeling, dashboards, heat maps)
K107. Natural language processing
K108. Precision medicine (customized treatment plans based on patient-specific data)
K109. Knowledge management and archiving science
K110. Methods for knowledge persistence and sharing
K111. Methods and standards for data sharing across systems (e.g., health information exchanges, public health reporting)

Domain 5: Leadership and Professionalism

K112. Environmental scanning and assessment methods and techniques
K113. Consensus building, collaboration, and conflict management
K114. Business plan development for informatics projects and activities (e.g., return on investment, business case analysis, pro forma projections)
K115. Basic revenue cycle
K116. Basic managerial/cost accounting principles and concepts
K117. Capital and operating budgeting
K118. Strategy formulation and evaluation
K119. Approaches to establishing Health Information Technology (HIT) mission and objectives
K120. Communication strategies, including one-on-one, presentation to groups, and asynchronous communication
K121. Effective communication programs to support and sustain systems implementation
K122. Writing effectively for various audiences and goals
K123. Negotiation strategies, methods, and techniques
K124. Conflict management strategies, methods, and techniques
K125. Change management principles, models, and methods
K126. Assessment of organizational culture and behavior change theories
K127. Theory and methods for promoting the adoption and effective use of clinical information systems
K128. Motivational strategies, methods, and techniques
K129. Basic principles and practices of project management
K130. Project management tools and techniques
K131. Leadership principles, models, and methods
K132. Intergenerational communication techniques
K133. Coaching, mentoring, championing and cheerleading methods
K134. Adult learning theories, methods, and techniques
K135. Teaching modalities for individuals and groups
K136. Methods to assess the effectiveness of training and competency development
K137. Principles, models, and methods for building and managing effective interdisciplinary teams
K138. Team productivity and effectiveness (e.g., articulating team goals, defining rules of operation, clarifying individual roles, team management, identifying and addressing challenges)
K139. Group management processes (e.g., nominal group, consensus mapping, Delphi method)

Teams

Knowledge Statements from the DoP

5C-1. Effective Interdisciplinary Teams

K137. Principles, models, and methods for building and managing effective interdisciplinary teams

K133. Coaching, mentoring, championing and cheerleading methods

K138. Team productivity and effectiveness (e.g., articulating team goals, defining rules of operation, clarifying individual roles, team management, identifying and addressing challenges)

K139. Group management processes (e.g., nominal group, consensus mapping, Delphi method)

K137. Principles, models, and methods for building and managing effective interdisciplinary teams

Human Resource Management

Short term

Plan human resource needs for each project

- Identify objective(s) of the team
- Identify resources needed for objective(s):
  - Talent (opportunities for employee growth)
  - Size of Team
  - Skills and Expertise
    - Technical skills (current or future system)
    - Subject matter experts (workflow)
    - Project Management
    - Informatics expertise

Long term

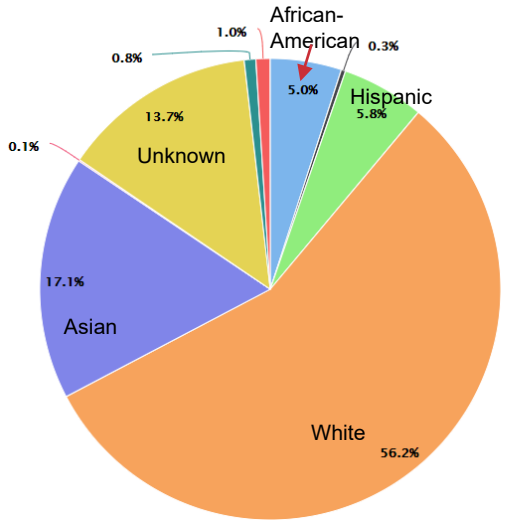
- Strategic Planning
  - Section 5A and AAMC 2020
- Informs recruiting practice
- Guides internal professional development

https://www.aamc.org/services/member-capacity-building/diversity-and-inclusion-strategic-planning-toolkit

Diversity, Equity and Inclusion

- Physician Workforce (2018)
  - 64.1% Male, 35.8% Female
  - AAMC Diversity in Medicine 2019 – Facts and Figures
- Percent of women and percent of racial and ethnic minorities decrease with higher positions in organizational charts

Figure 18. Percentage of all active physicians by race/ethnicity, 2018.



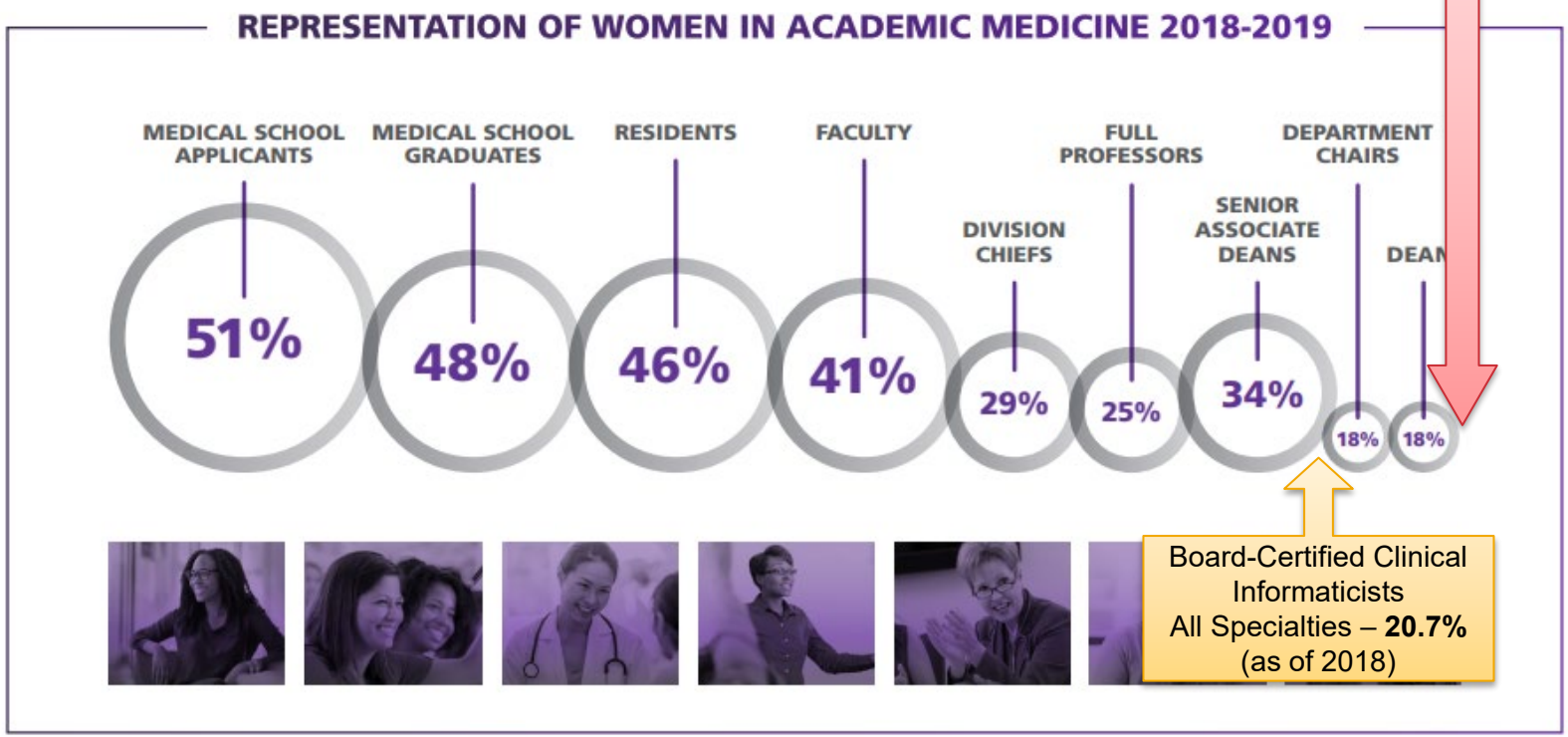
Click on legend item below to add or remove a section from the report.

- American Indian or Alaska Native (2,570)
- Asian (157,025)
- Black or African American (45,534)
- Hispanic (53,526)
- Multiple Race, Non-Hispanic (8,932)
- Native Hawaiian or Other Pacific Islander (941)
- Other (7,571)
- Unknown (126,144)
- White (516,304)

Note: Figure 18 shows the percentage of active physicians by race and ethnicity as of July 1, 2019.

Gender disparities in Medicine and Clinical Informatics

Board-Certified Clinical Informaticists – Pathology – **15.7%** (as of 2018)



Board-Certified Clinical Informaticists All Specialties – **20.7%** (as of 2018)

https://www.aamc.org/data-reports/faculty-institutions/report/state-women-academic-medicine; 2018-2019 report

Diversity, Equity and Inclusion

- Minority racial and ethnic representation in medicine is decreasing [Lett et al 2018]
- Female representation in clinical informatics is low
- Artificial intelligence methods may worsen gaps [Zou et al 2018]
- Resources for promoting diversity, equity and inclusion in healthcare:
  - American College of Healthcare Executives – Diversity Resources
  - American Association of Medical Colleges – Diversity and Inclusion Strategic Planning Toolkit

Human Resource Management

- Formalize the process of team assembly
  - Follow existing organizational policies and procedures (save time, avoid headaches)
- Job description is critical
  - Qualifications: Education, Experience, Skill Sets
  - Duties and Performance Expectations
  - Reporting Requirements
  - Organizational Responsibilities: Budget, Workspace/Overhead
- Internal Recruitment vs. External Hires

Human Resource Management

	Advantages	Disadvantages
Internal Recruitment	• Personnel already know organizational history • Strengths & weaknesses • Trusted from within • May be more cost effective • Known operator	• May spread internal talent too thinly • Personnel may be rooted in approaches that are already ineffective
External Recruitment	• Can hire specific talent if you don't have it in-house (or your internal talent is spread too thin) • Fresh perspective	• Costs $$$ • Lack of knowledge of organizational history and culture • Abilities and weaknesses are unknown

Recognition and rewards

Recognition and rewards

- For desirable behavior and completion of work
- May be tangible or intangible
  - Tangible rewards are usually extrinsic motivators (e.g., $$$)
  - Intangible rewards are usually intrinsic motivators
    - Opportunities for growth, new challenges, feeling valued
    - More valuable and long-lasting in effect than tangible rewards (extrinsic motivators)
  - See Motivation in Leadership lecture
- **Small rewards given periodically are more effective than one large reward at the end of a project**

Giving Feedback

- Do not use the positive-negative-positive approach (i.e., sandwiching negative feedback between two compliments)
- Use the **Ask-Tell-Ask** approach [French 2015, Suart 2015]
  - **Ask** the learner for their perceptions about strengths and challenges
  - **Tell** them your impressions backed by observations and specific examples
  - **Ask** them what can be improved and how – have them assist in developing a learning plan

Performance Reviews

- Best when measured against **pre-defined** and **understood** objectives, cost boundaries and timeliness (**performance indicators**)
- Allows objective measurement of performance
- Performed on
  - Individuals
  - Teams
    - Performance indicators for teams (different)
      - Decreased staff turnover rate
      - Examples of increased team cohesiveness

K133. Coaching, mentoring, championing and cheerleading methods

Professional Development

- May be desired by the employee
- May be needed after an error, performance review or other event
- Results of professional development should be measurable
  - Skill assessments, examinations, personal observation

Professional Development Terms

Term	Description	Examples
Cheerleading	• Providing enthusiastic support and encouragement • Celebrate accomplishments of the mentee	**Cheerleader**: "Good Job!" and "You can do this."
Championing (can include **sponsoring**)	• Vouching for someone by nominating that person for **opportunities** → making them **visible** to others; taking a stand for them • Champion or sponsor may have no defined relationship with the person they are putting forward	**Champion**: "I know someone who would be great for this…"
Mentoring	• Mentor provides advice and support • Design phase (plan) → better results • Mentor is often not the immediate supervisor	**Mentee**: "How do you write papers when you are on service?"
Coaching	• Developing an individual / team to higher competency and performance • Coach and individual co-equal; coach is often the immediate supervisor • Does not require a design process; powerful motivator • Listen MORE and speak LESS; let WAIST (Why Am I Still Talking?) be your guide	**Coach**: "Let's talk about the skills you need to do X."
Counseling	• Focuses on what an individual or team can do, but won't	**Counselor**: "Tell me why you don't want to do X."

Professional Development Terms

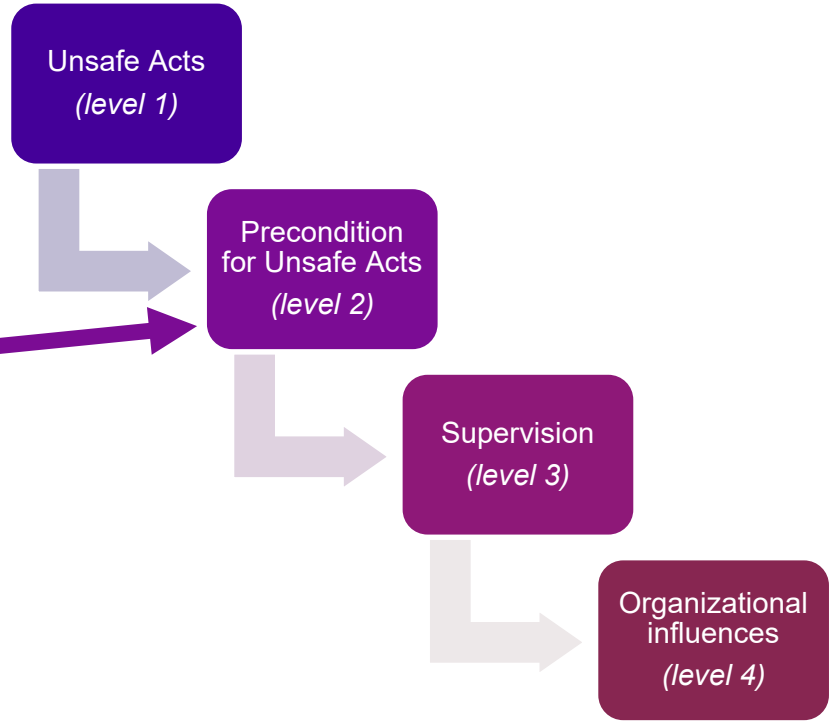
Activity	Timeframe	End-goal for recipient	Structure	Agenda set by	Outcome is measured?	Person doing activity is formally trained for it?
Cheerleading	Seconds	Encouragement	Informal	N/A	Not usually	No
Championing (can include **sponsoring**)	Seconds	Visibility	Informal	N/A	Not usually	No
Mentoring	Years	Overall career development	Formal to informal	Mentee	Not usually	No
Coaching	Weeks to Months	Improve performance in a specific area	Formal	Coach	Yes	Yes
Counseling	Week or two	**Unblock** performance in a specific area	Formal	Counselor	Yes	Sometimes

Tran 2020; KSU Site

Poor Performance vs. Systematic Error

Human Factors Analysis Classification System (HFACS)

- Provides methods for investigation of errors
- Originally designed for US Navy and Marine Corps
- **Most factors are <u>not</u> due to the operator**
- Operator factors = Level 2
  - Personnel factors
  - Condition of operators
- [Diller et al 2014, HFACS]



Poor Performance

Possible Reason for Poor Performance	Possible courses of action
Mismatch between employee's skills / desires and job requirements (HFACS level 2 error)	• Professional development for employee • Assign to better matched job
Behavioral, work ethic (HFACS level 2 error)	• Provide feedback, opportunities for remediation • Employment termination if necessary
Inadequate supervision (HFACS level 3 error)	• Address supervisor issues
Organizational influences (HFACS Level 4 error)	• Seek out and resolve problems with organizational culture

Termination

- Make sure your organization has clearly stated policies and procedures
- Follow them
- Communicate and Document
- Involve your HR department early

K138. Team productivity and effectiveness

(e.g., articulating team goals, defining rules of operation, clarifying individual roles, team management, identifying and addressing challenges)

Team Goal Setting

- Team's goals are set based on required deliverables
- Goals/deliverables should be **SMART** [MindTools 2018, MindTools #2 2018, UVA Human Resources 2018]

Specific	**S**imple, **S**ensible, **S**ignificant
Measurable	**M**eaningful, **M**otivating
Achievable	**A**greed, **A**ttainable
Relevant	**R**esults-based, **R**easonable, **R**ealistic and **R**esourced
Time-bound	**T**ime-based, **T**ime-limited, **T**ime/cost-limited, **T**ime-sensitive

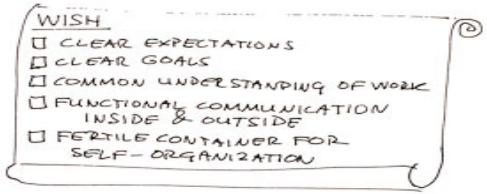
- Identify team member(s) responsible for each task
- Identify and Conduct Measures of Success (**outcome measures**)
- Re-visit goals periodically. Effect mid-course corrections.

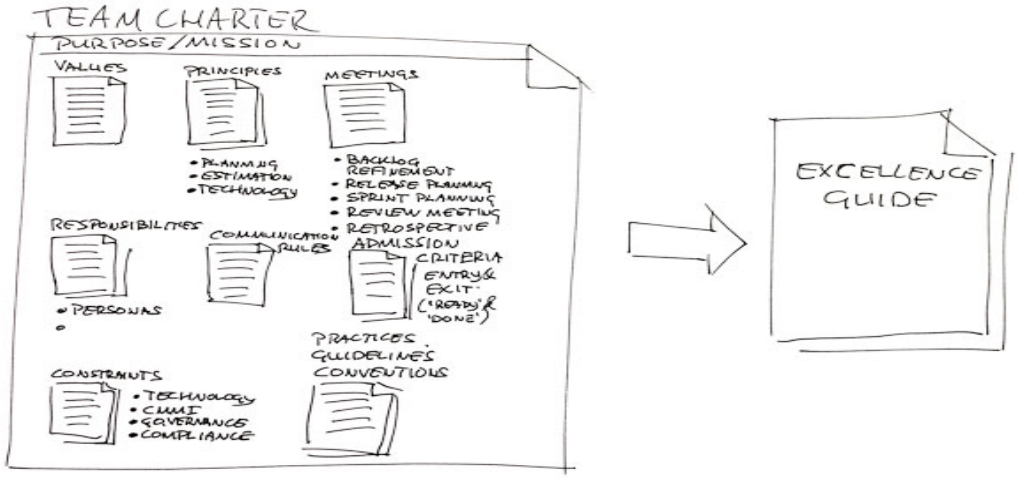
Team Rules of Operation

- a.k.a. **Ground rules**
- Rules which establish clear expectations regarding acceptable behavior by team members
  - Decrease misunderstandings
  - Increase productivity
- Document:
  - Team members, Team Roles, Reporting lines
  - Approach to Decision-Making
  - Resources, Timelines and Deliverables
  - Meeting Schedule and requirements for Independent Work
- One way to do this is to use a **Team Charter**

Team Charter Components

1. Purpose
2. Stakeholders
3. Membership
4. Responsibility
5. Decision-Making
6. Team Name
7. Life Expectancy
8. Communication
9. Financial Resources



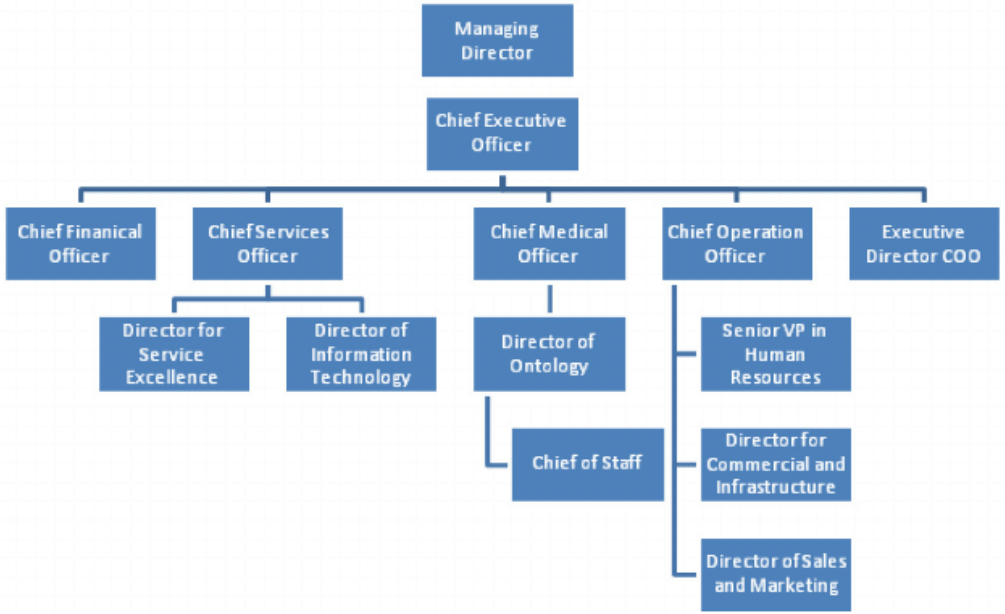


Clarifying individual roles

Organization charts

- a.k.a. Organizational Breakdown Structure (OBS)
- Traditionally represented as a hierarchical diagram
- Organized into departments, units and/or teams with bosses and subordinates

Example



Clarifying individual roles

Responsibility Assignment Matrix (a.k.a. RACI matrix) [Doglione 2018]

- Shows resources (roles) assigned to each responsibility or task
- Shows
  - Resources assigned to a project listed in the column headers
  - Responsibilities/activities on the left
  - Box data indicates level of responsibility via the **RACI acronym**

R	**Responsible**	Person who is **Responsible** for completing the task.
A	**Accountable**	Person who is **Accountable** to ensure that the task completed. May be Responsible person or the Responsible person's supervisor/boss.
C	**Consulted**	Person who is **Consulted** regarding decisions for this task.
I	**Informed**	Person who needs to be kept **Informed** of this task's progress, decisions and/or actions.

Clarifying individual roles

Responsibility Assignment Matrix (a.k.a. RACI matrix)

RACI Matrix	Project Manager	IT Manager	EHR Analyst	Physician Champion	Nursing Champion	Section Chief	CMIO	CIO
Ensure that tasks are being completed according to Project Plan	R/A	A	R	C	C	I	I	I
Provide vision and mission for the project	I	I	I	I	I	C	R/A	R/A
Engage resources with the required skills and mind set	R/A	R/A	I	I	I	C	C	C
Define acceptance criteria	C	R/A	I	R/A	R/A	C	C	C
Write validation plan	C	A	R/A	C	C	I	I	I

Clarifying individual roles

Position Descriptions

- Text document that lists the specific responsibilities of an individual position
- Important to have a complete and accurate list of responsibilities
- Responsibilities are the benchmarks for employee performance reviews

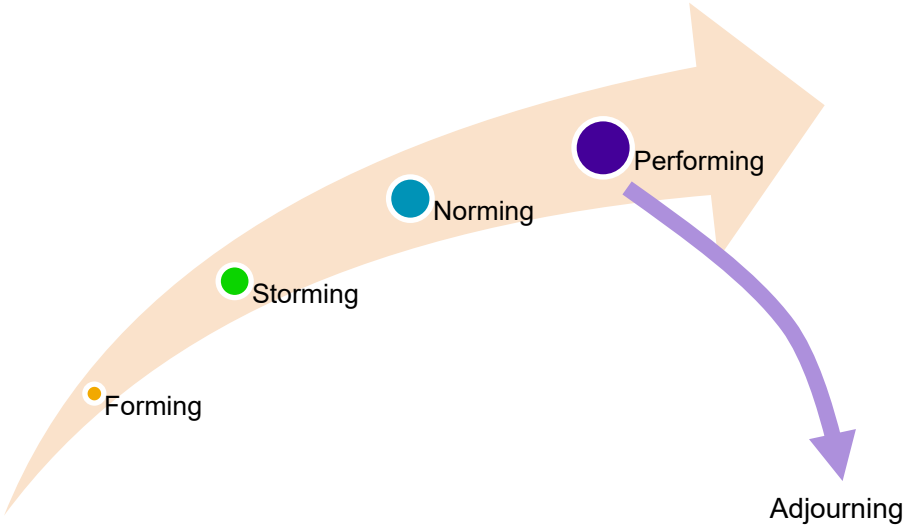
Team Effectiveness

Organizational theory

- Provides information on the way in which people, teams and organizational units behave
- Effective use can shorten time, cost and effort needed for projects and operations

Team development

- **Tuckman ladder**
  - Five stages of development (Tuckman 1965, Tuckman & Jensen 1977)



Tuckman Ladder

Forming	• Team meets and learns about the project, roles and responsibilities • Team members independent and less open
Storming	• Team begins work • Collaboration and openness to different ideas important • Lack of this --> counterproductive
Norming	• Team members begin to adjust work habits and behaviors to support the team • Trust begins
Performing	• Team operates as well-organized unit • Team members are inter-dependent rather than independent
Adjourning	• Team members leave as the project closes

Building Team Effectiveness

Training

- Team trains together toward a common goal

Team-building activities

Conflict Management discussed in section on Leadership.

Colocation teams (a.k.a. tight matrix)

- Places most if not all team members in the same physical space (e.g., "war room")
- Goal is to enhance performance as a team
- Advantages
  - Personal communication
  - Non-verbal cues that may be missed when using conference calls or even video conferencing
  - Improves focus for team members who are otherwise in high-distraction environments

Building Team Effectiveness

Virtual teams

- Teams with a shared goal that fulfill their roles with little or no time spent meeting face-to-face
- Email, web conferencing, instant message, social media, etc.
- Advantages
  - Geographically agnostic
  - Increases availability of experts who are not local
  - Allows teleworking
  - Allows flexibility of staff shift schedules
  - Facilitates inclusion of individuals with limited mobility and certain disabilities
  - More cost efficient (reduces/eliminates travel expenses)

K139. Group management processes

(e.g., nominal group, consensus mapping, Delphi method)

Group Decision-Making

Advantages

- Diverse groups generate variety & higher quality decisions than individuals or homogeneous groups
- Greater collective understanding of course of action chosen - improves buy-in and adoption

Disadvantages

- Slower and certain cognitive biases (process losses) may need to be avoided and/or mitigated
- These can lead to poor decisions

Groupthink	• Individuals pressured to conform to “dominant view" in group • Dissenting views suppressed • Alternative courses of action **not** fully explored • More likely in highly cohesive groups with a dominant leader
Bandwagon Effect	• A form of groupthink in which a person **believes something to be true** just because others in the group do
Group polarization	• Tendency of a group to entertain more risky or extreme (think “polar end”) solutions to a problem than they did before the group began discussing the topic • Potential negative consequences perceived to be diffused throughout the group

Group Decision-Making: Common Approaches

- Nominal Group Technique
- Consensus Mapping
- Delphi Method

Nominal Group Technique

- Group members individually & privately develop ideas or proposed solutions in writing
- Each group member shares one item from their list
- Continue until all ideas/alternatives are publicly recorded (white board, flip chart, etc.)
  - no criticism or analysis at this stage
- Group engages in discussion/analysis of these options
- Conclude with **multi-voting**
  - group members ranking or rating all options – highest ranked option(s) are chosen

Nominal Group Technique

Pros

- Promotes participation of all team members and considers all ideas

Cons

- Approach is not very flexible
- Not efficient for addressing different ideas about multiple related subjects or problems

Best application:

- Generate efficient discussion regarding single problem or situation
- Applicable when there are multiple possible ways to address/solve the problem under consideration

Consensus Mapping

- A facilitator and group reach consensus about how best to arrange or sequence multiple inter-related activities into a useable plan of action
- Example of use for consensus mapping: implementing a new information system department-wide or facility-wide
- Based on expectation of compromise:
  - Not everyone gets everything they want out of final decision, but everyone gets a final decision they can support

Consensus Mapping

1. Create a master list of all ideas, tasks or projects under consideration

2. Form small groups: 2 to 4 task groups, each 5-9 people

- **Clustering** – individuals within the small groups attempt to group the ideas into related clusters or categories.
- Sub-groups of 2 or 3 people share each other's clusters
- Sub-groups merge their individual clusters into a shared clustering they can all live with

3. Large Group review and re-evaluation of the original ideas, in light of the new clustering activity

Consensus Mapping

4. Facilitator(s) create ‘Strawman’ integrated map

- consolidate the group maps into single overall cluster map, containing all ideas, categories & relationships from small groups
- Facilitator presents Strawman Map to whole group

5. Map reconfiguration (by Small Group)

- small task groups reconvene & use Strawman Map to develop their own sequential maps

6. Large Group presentation

- each small task group shares its map of sequentially linked clusters

7. Map consolidation

- Representatives from each small group meet to construct one final map that combines features of all maps.

Consensus Mapping

- Pros
  - Useful to organize a large number of inter-related or inter-dependent elements into one executable plan
  - Each team member has opportunity to provide input and opinions; Solution predicated on the agreement or acceptance of all team members
- Con
  - Works best with a trained, experienced group

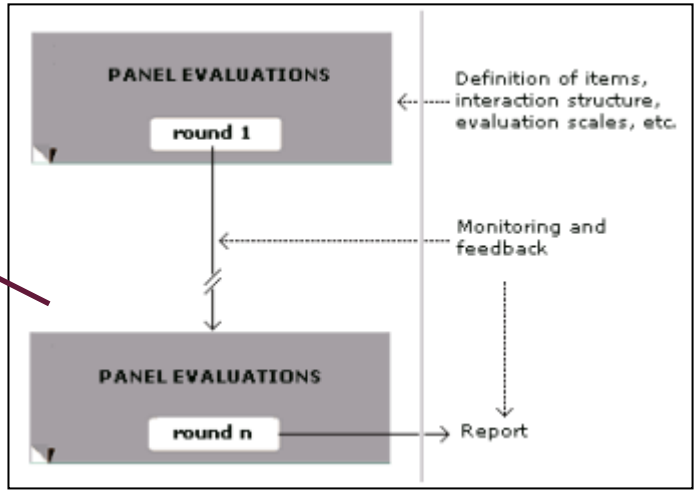
Delphi Method

A systematic, interactive forecasting method which relies on a panel of experts

Originally developed by RAND Corporation in 1950s to forecast impact of technology on warfare

Oracle at Delphi

Delphi Method



Delphi Method

1. Experts answer questionnaires individually in two or more rounds.
2. After each round, a facilitator provides an anonymous summary of the experts' forecasts and reasons for their judgments.
3. Then, the experts are encouraged to revise their earlier answers in light of the replies of other members of the panel.
4. Goal → Range of answers decreases with each round. Group opinion moves toward a final answer.
5. The process stops when a pre-defined criterion is reached (e.g., number of rounds, achievement of consensus).
6. The mean or median scores of the final rounds determines the results.

Delphi Method

Pros

- Can be conducted without face-to-face meetings
- Can accommodate opinions from a large number of subject matter experts
- Can be conducted anonymously (helpful for politically charged issues or groups)
- Minimizes bandwagon effect, groupthink and group polarization

Cons

- Range of opinions are as diverse as the experts in the group
- Best written opinions may sway group opinion
- Facilitators may introduce bias in the summaries

Group Decision-Making

Project management decision-making

- Six phase model
- Phases:
  1. Problem definition
  2. Solution generation (brainstorming)
  3. Ideas to action (evaluate solutions and pick one)
  4. Solution action planning (implement solution)
  5. Solution evaluation planning (evaluate solution)
  6. Evaluation of the outcome and process (evaluate how well problem solved, how well process worked)

Multi-Criteria Decision Analysis (MCDA)

- A.k.a. Multiple Criteria Decision Making (MCDM)
  - [Hansen et al 2019]
- Systematic analytical approach to evaluate and rank many possible choices using **multiple weighted criteria**
- Steps
  1. Define the decision to be made
     objectives, all possible choices, decision-makers, output required
  2. Specify criteria
  3. Gather information on criteria for each choice
  4. Score each choice on each criterion
  5. Weight the criteria
  6. Apply scores and weights to rank the choices
  7. Use output to support decision making

Group Decision-Making: Other Methods

Brainstorming	• Collect all ideas from group members regardless of merit • Does not include voting or prioritization • Often used with other techniques
Idea/mind mapping	• Ideas are visually mapped into parent-child and other relationships to reflect commonality and differences
Affinity Diagram	• Allows large numbers of ideas to be classified into groups for review • Similar to mind-mapping
Process decision program charts (PDPC)	• Used to understand goal in relation to steps needed to achieve it • Useful for contingency planning
Interrelationship digraphs	• Adaptation of relationship diagrams for complex problem solving for up to 50 relevant items

Question

Which of the following group decision-making methods is based on the expectation of compromise?

A. Delphi Method
B. Consensus mapping
C. Groupthink
D. Nominal Group

Question

Which of the following group decision-making methods is based on the expectation of compromise?

A. Delphi Method

B. Consensus mapping

C. Groupthink

D. Nominal Group

Consensus Mapping is a Group Decision-Making process in which a facilitator and group reach consensus about how best to arrange or sequence multiple inter-related activities into a useable plan of action. The process is based on the expectation of compromise – not everyone is going to get everything they want out of the final decision, but everyone gets a final decision they can support. Group think is not a decision-making methods but a concept whereby the opinions of the group are dominated by a single individual or party. The Delphi method is a forecasting method for decision-making, and nominal group is a decision-making method using multi voting to choose the highest-ranked option for a single decision.

Managing Meetings

- Determine necessity of meeting
- Determine length of meeting
  - **Parkinson's Law**: "work expands to fill the time available for its completion"
  - If you schedule the mtg for an hour, it will take an hour even if you only needed 15 minutes
- Determine venue: face-to-face versus teleconference versus web-based
- Limit recurring meetings
- Choose participants wisely
- Don't schedule if key people can't be there

Managing Meetings – Preparation

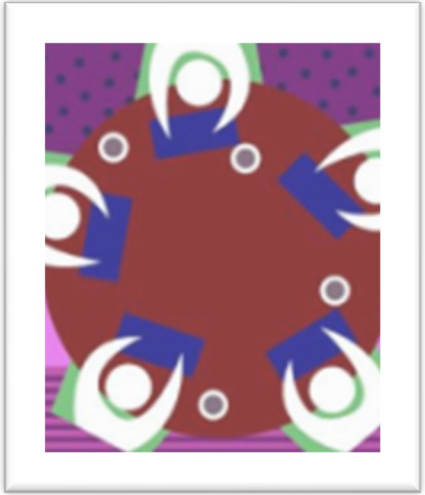
- Develop and distribute clear agenda
- Put time limits on each agenda item
- Identify participants needed to accomplish tasks on agenda
- Gather and distribute the materials and “pre-work” needed to accomplish agenda

Managing Meetings – Beginning the Meeting

- Assign the following responsibilities to one or more members of the group:
  - **Facilitator** (leads the meeting)
  - **Time-keeper** (makes sure that the groups sticks to the times allocated on the agenda)
  - **Scribe** (writes down minutes of meeting)
- State the purpose of the meeting
  - Review agenda
- Introduce any new members and guests
- State/remind group of ground rules for operation

Managing Meetings – During the Meeting

- Adhere to your Rules of Operation during meeting
  - Re-direct behaviors that break the ground rules
- Record key points during the meeting (whiteboard, flip chart, shared web-based screen)
- Restate decisions arrived at during meeting
- At meeting end, review action plan
  - Action item
  - Person responsible
  - Date of expected completion



Managing Meetings – After the Meeting

- Scribe generates minutes for distribution
  - Should include attendance, decisions made and action items
- Give group members the opportunity to review and edit minutes
- Specifically notify group members not present if they have been assigned action items

Use skills in negotiation and conflict management (see Leadership section)

Communications

Clinical Informatics Subspecialty Delineation of Practice (CIS DoP)

Domain 1: Fundamental Knowledge and Skills (no Tasks are associated with this Domain which is focused on fundamental knowledge and skills)

Clinical Informatics

K001. The discipline of informatics (e.g., definitions, history, careers, professional organizations)
K002. Fundamental informatics concepts, models, and theories
K003. Core clinical informatics literature (e.g., foundational literature, principle journals, critical analysis of literature, use of evidence to inform practice)
K004. Descriptive and inferential statistics
K005. Health Information Technology (HIT) principles and science
K006. Computer programming fundamentals and computational thinking
K007. Basic systems and network architectures
K008. Basic database structure, data retrieval and analytics techniques and tools
K009. Development and use of interoperability/exchange standards (e.g., Fast Health Interoperability Resources [FHIR], Digital Imaging and Communications in Medicine [DICOM])
K010. Development and use of transaction standards (e.g., American National Standards Institute X12)
K011. Development and use of messaging standards (e.g., Health Level Seven [HL7] v2)
K012. Development and use of ancillary data standards (e.g., imaging and Laboratory Information System[LIS])
K013. Development and use of data model standards
K014. Vocabularies, terminologies, and nomenclatures (e.g., Logical Observation Identifiers Names and Codes [LOINC], Systematized Nomenclature of Medicine --Clinical Terms [SNOMED-CT], RxNorm, International Classification Of Diseases[ICD], Current Procedural Terminology [CPT])
K015. Data taxonomies and ontologies
K016. Security, privacy, and confidentiality requirements and practices
K017. Legal and regulatory issues related to clinical data and information sharing
K018. Technical and non-technical approaches and barriers to interoperability
K019. Ethics and professionalism

The Health System

K020. Primary domains of health, organizational structures, cultures, and processes (e.g., health care delivery, public health, personal health, population health, education of health professionals, clinical research)
K021. Determinants of individual and population health
K022. Forces shaping health care delivery and considerations regarding health care access
K023. Health economics and financing
K024. Policy and regulatory frameworks related to the healthcare system
K025. The flow of data, information, and knowledge within the health system

Domain 2: Improving Care Delivery and Outcomes

K026. Decision science (e.g., Bayes theorem, decision analysis, probability theory, utility and preference assessment, test characteristics)
K027. Clinical decision support standards and processes for development, implementation, evaluation, and maintenance
K028. Five Rights of clinical decision support (i.e., information, person, intervention formats, channel, and point/time in workflow)
K029. Legal, regulatory, and ethical issues regarding clinical decision support
K030. Methods of workflow analysis
K031. Principles of workflow re-engineering
K032. Quality improvement principles and practices (e.g., Six Sigma, Lean, Plan-Do-Study-Act [PDSA] cycle, root cause analysis)
K033. User-centered design principles (e.g., iterative design process)
K034. Usability testing
K035. Definitions of measures (e.g., quality performance, regulatory, pay for performance, public health surveillance)
K036. Measure development and evaluation processes and criteria
K037. Key performance indicators (KPIs)
K038. Claims analytics and benchmarks
K039. Predictive analytic techniques, indications, and limitations
K040. Clinical and financial benchmarking sources (e.g., Gartner, Healthcare Information and Management Systems Society [HIMSS] Analytics, Centers for Medicare and Medicaid Services [CMS], Leapfrog)
K041. Quality standards and measures promulgated by quality organizations (e.g., National Quality Forum [NQF], Centers for Medicare and Medicaid Services [CMS], National Committee for Quality Assurance [NCQA])
K042. Facility accreditation quality and safety standards (e.g., The Joint Commission, Clinical Laboratory Improvement Amendments [CLIA])
K043. Clinical quality standards (e.g., Physician Quality Reporting System [PQRS], Agency for Healthcare Research and Quality [AHRQ], National Surgical Quality Improvement Program [NSQIP], Quality Reporting Document Architecture [QRDA], Health Quality Measure Format [HQMF], Council on Quality and Leadership [CQL], Fast Health Interoperability Resources [FHIR] Clinical Reasoning)
K044. Reporting requirements
K045. Methods to measure and report organizational performance
K046. Adoption metrics (e.g., Electronic Medical Records Adoption Model [EMRAM], Adoption Model for Analytics Maturity [AMAM])
K047. Social determinants of health
K048. Use of patient-generated data
K049. Prediction models
K050. Risk stratification and adjustment
K051. Concepts and tools for care coordination
K052. Care delivery and payment models

Domain 3: Enterprise Information Systems

K053. Health information technology landscape (e.g., innovation strategies, emerging technologies)
K054. Institutional governance of clinical information systems
K055. Information system maintenance requirements
K056. Information needs analysis and information system selection
K057. Information system implementation procedures
K058. Information system evaluation techniques and methods
K059. Information system and integration testing techniques and methodologies
K060. Enterprise architecture (databases, storage, application, interface engine)
K061. Methods of communication between various software components
K062. Network communications infrastructure and protocols between information systems (e.g., Transmission Control Protocol/Internet Protocol [TCP/IP], switches, routers)
K063. Types of settings (e.g., labs, ambulatory, radiology, home) where various systems are used
K064. Clinical system functional requirements
K065. Models and theories of human-computer (machine) interaction (HCI)
K066. HCI evaluation, usability engineering and testing, study design and methods
K067. HCI design standards and design principles
K068. Functionalities of clinical information systems (e.g., Electronic Health Records [EHR], Laboratory Information System [LIS], Picture Archiving and Communication System [PACS], Radiology Information System [RIS] vendor-neutral archive, pharmacy, revenue cycle)
K069. Consumer-facing health informatics applications (e.g., patient portals, mobile health apps and devices, disease management, patient education, behavior modification)
K070. User types and roles, institutional policy and access control
K071. Clinical communication channels and best practices for use (e.g., secure messaging, closed loop communication)
K072. Security threat assessment methods and mitigation strategies
K073. Security standards and safeguards
K074. Clinical impact of scheduled and unscheduled system downtimes
K075. Information system failure modes and downtime mitigation strategies (e.g., replicated data centers, log shipping)
K076. Approaches to knowledge repositories and their implementation and maintenance
K077. Data storage options and their implications
K078. Clinical registries
K079. Health information exchanges
K080. Patient matching strategies
K081. Master patient index
K082. Data reconciliation
K083. Regulated medical devices (e.g., pumps, telemetry monitors) that may be integrated into information systems
K084. Non-regulated medical devices (e.g., consumer devices)
K085. Telehealth workflows and resources (e.g., software, hardware, staff)

Domain 4: Data Governance and Data Analytics

K086. Stewardship of data
K087. Regulations, organizations, and best practice related to data access and sharing agreements, data use, privacy, security, and portability
K088. Metadata and data dictionaries
K089. Data life cycle
K090. Transactional and reporting/research databases
K091. Techniques for the storage of disparate data types
K092. Techniques to extract, transform, and load data
K093. Data associated with workflow processes and clinical context
K094. Data management and validation techniques
K095. Standards related to storage and retrieval from specialized and emerging data sources
K096. Types and uses of specialized and emerging data sources (e.g., imaging, bioinformatics, internet of things (IoT), patient-generated, social determinants)
K097. Issues related to integrating emerging data sources into business and clinical decision making
K098. Information architecture
K099. Query tools and techniques
K100. Flat files, relational and non-relational/NoSQL database structures, distributed file systems
K101. Definitions and appropriate use of descriptive, diagnostic, predictive, and prescriptive analytics
K102. Analytic tools and techniques (e.g., Boolean, Bayesian, statistical/mathematical modeling)
K103. Advanced modeling and algorithms
K104. Artificial intelligence
K105. Machine learning (e.g., neural networks, support vector machines, Bayesian network)
K106. Data visualization (e.g., graphical, geospatial, 3D modeling, dashboards, heat maps)
K107. Natural language processing
K108. Precision medicine (customized treatment plans based on patient-specific data)
K109. Knowledge management and archiving science
K110. Methods for knowledge persistence and sharing
K111. Methods and standards for data sharing across systems (e.g., health information exchanges, public health reporting)

Domain 5: Leadership and Professionalism

K112. Environmental scanning and assessment methods and techniques
K113. Consensus building, collaboration, and conflict management
K114. Business plan development for informatics projects and activities (e.g., return on investment, business case analysis, pro forma projections)
K115. Basic revenue cycle
K116. Basic managerial/cost accounting principles and concepts
K117. Capital and operating budgeting
K118. Strategy formulation and evaluation
K119. Approaches to establishing Health Information Technology (HIT) mission and objectives
K120. Communication strategies, including one-on-one, presentation to groups, and asynchronous communication
K121. Effective communication programs to support and sustain systems implementation
K122. Writing effectively for various audiences and goals
K123. Negotiation strategies, methods, and techniques
K124. Conflict management strategies, methods, and techniques
K125. Change management principles, models, and methods
K126. Assessment of organizational culture and behavior change theories
K127. Theory and methods for promoting the adoption and effective use of clinical information systems
K128. Motivational strategies, methods, and techniques
K129. Basic principles and practices of project management
K130. Project management tools and techniques
K131. Leadership principles, models, and methods
K132. Intergenerational communication techniques
K133. Coaching, mentoring, championing and cheerleading methods
K134. Adult learning theories, methods, and techniques
K135. Teaching modalities for individuals and groups
K136. Methods to assess the effectiveness of training and competency development
K137. Principles, models, and methods for building and managing effective interdisciplinary teams
K138. Team productivity and effectiveness (e.g., articulating team goals, defining rules of operation, clarifying individual roles, team management, identifying and addressing challenges)
K139. Group management processes (e.g., nominal group, consensus mapping, Delphi method)

Communications

Knowledge Statements from the DoP

5C-2. Effective Communications

K071. Clinical communication channels and best practices for use (e.g., secure messaging, closed loop communication)

K120. Communication strategies, including one-on-one, presentation to groups, and asynchronous communication

K121. Effective communication programs to support and sustain systems implementation

K122. Writing effectively for various audiences and goals

K132. Intergenerational communication techniques

K134. Adult learning theories, methods, and techniques

K135. Teaching modalities for individuals and groups

K136. Methods to assess the effectiveness of training and competency development

K071. Clinical communication channels and best practices for use

(e.g., secure messaging, closed loop communication)

Communication

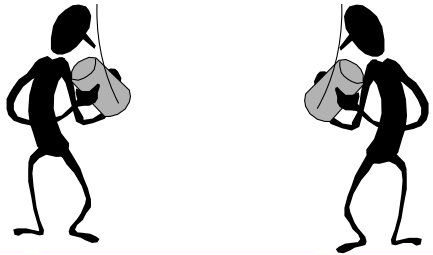
- **Effective communication**
  - Information that is provided...
    - In the **right** format
    - At the **right** time
    - To the **right** audience
    - With the **right** impact
- **Efficient communication**
  - Only providing the information that is needed
- **Successful communication**
  - Intended meaning is preserved from sender to receiver

Poor communication is top reason for error and delays in healthcare

- [Makary et al 2016, Car et al 2016, James 2013]
- The Joint Commission lists communication factors as major root cause of error [TJC RCA]

Verbal communication

- estimated that only **30%** of the message is accurately understood by the receiver



Communication

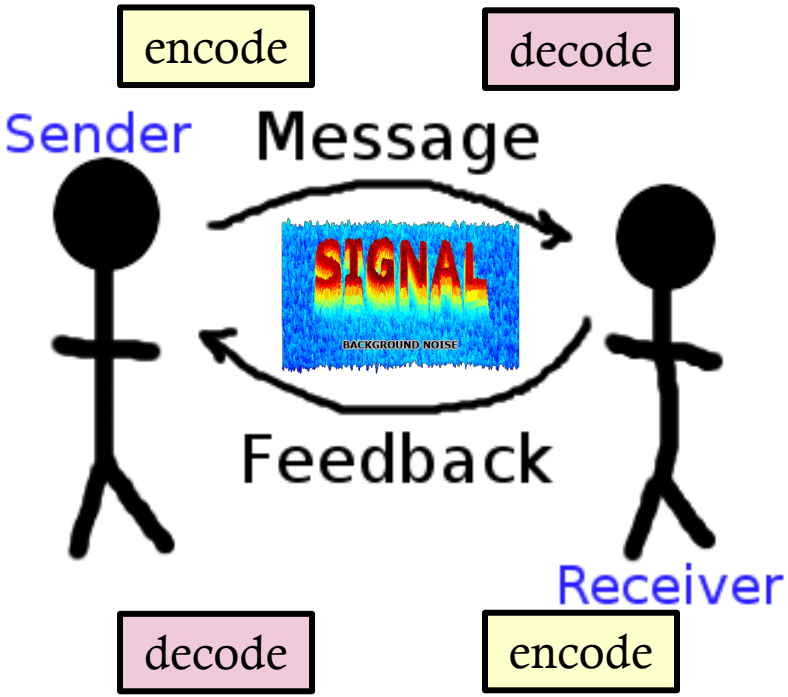
One of the most important elements of communication is…

LISTENING

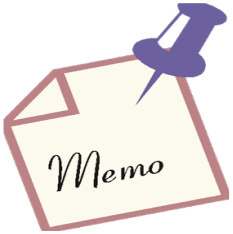
Model of Communication

Basic Communication Model

- Sender (encoder) sends a message to the Receiver (decoder) (Berlo, 1960)
  - Sender produces message
  - Sender encodes message into a communication medium
  - Message transmits to receiver (with variable noise)
  - Receiver decodes message (filters noise)
  - Receiver acknowledges message by sending feedback (new message) via reverse process



Types of Communication



Written

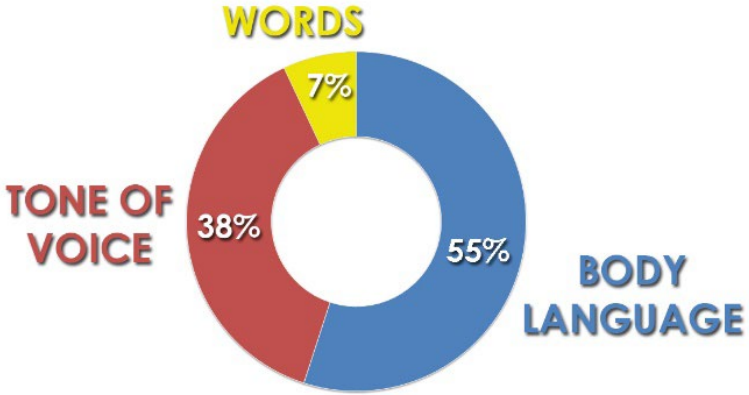
Verbal (oral)

- Vocal Intonation

Non-verbal

- Body Language
- Facial Expressions

What Makes Up What We Hear



Spectra of Communications

Internal ↔ external

Formal ↔ informal

Vertical ↔ horizontal

Official ↔ unofficial

Written ↔ oral

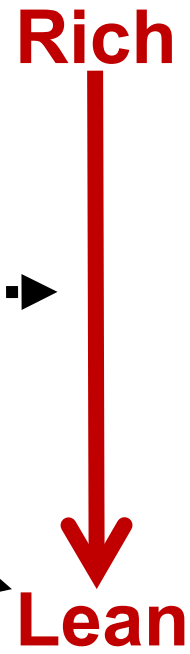
Verbal ↔ nonverbal

Information Richness

Media Richness Theory, Daft and Lengel, 1984

Communication channels on spectrum from rich to lean

- Auditory and non-verbal cues present
  - Face-to-face (in person; video communication)
  - Least prone to communication error
  - Takes time and can be expensive
- Audio without non-verbal cues
  - Telephone and audio recordings
- No audio or non-verbal cues
  - email, web pages, memos, etc.
  - Most prone to communication error
  - Fast and cheap; least dependent on memory



EHRs as a Communication Tool

Pros

- Can foster Ubiquitous Communication – communication anywhere, anytime, 24/7
- Simultaneous access to same information (if not same document) by multiple individuals (nurse, doctor, pharmacist, administrative support personnel, patient)

Cons

- Decreases human situational awareness and interpersonal interaction
- Not ideal in hectic environments (ER, ICU, code)
- May not support rapid transitions from one location to another
- Many target audiences with different levels of education and perspectives
- Too much information → information overload → decreased communication
  - decreased signal-to-noise ratio
  - alert fatigue

K120. Communication strategies, including one-on-one, presentation to groups, and asynchronous communication

Preparing Effective Communication

Identify and characterize the target audience (receivers)

- Individual vs. group, age, education, socioeconomic and cultural factors, readiness to learn, level of expertise on the topic, communication forum
- Patients vs. healthcare workers

Anticipate possible resistance / confusion

Individual (One-On-One) Communication

Listening and asking questions

- May feel counter-intuitive in some situations

Be non-threatening and without physical barriers

- Avoid sitting behind your desk
- Put your head at the same level as the other person

Understand (but don't assume) the other person's cultural, organizational and work beliefs

Use rich channels of communication (lots of non-verbal cues)

Mean what you say / say what you mean

Invite feedback

- "Tell me what I am missing"
- "Did I answer your question?"

Group Communication – Basic Principles

Informal Group Settings

- e.g., committee meetings
- See section on Building Effective Teams (managing meetings)

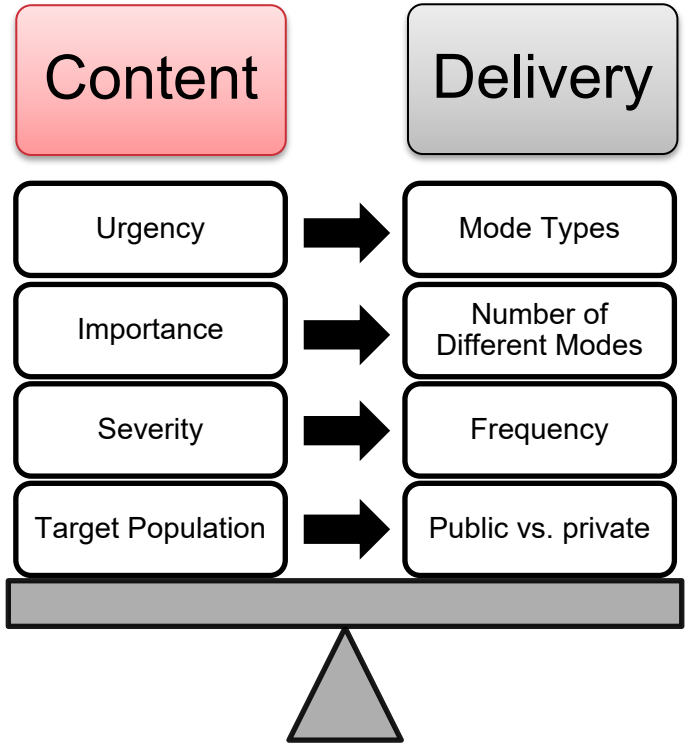
Group Communication – Basic Principles

Presentations/Lectures

- Prepare
  - Know your material
  - Check out the venue and equipment the day before
- PRACTICE – segues, etc.
- Reduce anonymity with audience
  - Chat and engage with participants as they get seated
  - Know how to shake hands (or bump elbows or wave during a pandemic)
- Be authoritative but don't talk too fast ☺

Mass Communications

- Balance content against delivery
- Have a pre-defined communication plan for urgent and important events
- Utilize different modes
  - Email, web pages, flyers, letters, faxes, town halls, meetings, training sessions, EHR dashboards, social media, discussion boards, text messaging, etc.
- Feedback and analytics
- Assess effectiveness of communication
- Adjust as necessary



Mass Communication Methods

Method	Description	Pros	Cons	Examples
Interactive	Multidirectional exchange of information	• Most efficient way to ensure information was understood by recipients • Ensures receipt of information	• Can ensure understanding of only a limited number of people at one time	• Meetings • Phone calls • Instant messaging • Video conferencing
Push	Information pushed to specific people who need it	• Very efficient distribution	• Does not ensure understanding • May not know if message was received	• Letters • Reports • Faxes • Voicemail • Blogs • Press releases
Pull	Recipients must initiate accessing the information	• Useful for large volumes of information and very large audiences • May be able to track who pulled in the information • May include competency tests to ensure understanding	• Recipients may not know information exists and therefore don't pull it • Recipients may not have time (or will) to retrieve the information	• Intranet / Internet sites • E-learning • Knowledge repositories

Secure Messaging

- Two main uses in healthcare
  - Provider ←→ Provider
  - Provider ←→ Patient
- The ability to send and receive secure messages to/from patients is a requirement of EHR certification
  - https://www.healthit.gov/test-method/secure-messaging

Secure Messaging [Wickr 2019]

Term	Description	Comments
Secure Messaging Protocols (SMP)	Allows people to send messages to each other securely over an untrusted (and possibly adversarial) network such as the Internet	Uses encryption to achieve security among other practices (see other lectures)
• **Asynchronous communication**	Communication that occurs when the sender and recipient are **not** online at the same time • Message put into queue and does not require immediate response to continue processing • A.k.a. Fire-and-forget information exchange • A.k.a. message-oriented middleware	Used when messages can wait • Patient portals • Email
• **Synchronous communication**	Communication that occurs when both the sender and receiver are online • e.g., alerts intended to be received as soon as they are sent	Used when messages cannot wait • Critical radiology results • Critical lab values and results • Other urgent notifications
• **End-to-End Security**	Messages are secure from sender to receiver provided that the protocol is followed	Worst that can happen is denial of service
Off-the-Record (OTR) protocols	Cryptographic protocol designed to provide denial of participating in the messaging conversation	Not relevant to healthcare because messages should be secure but not anonymized

Closed Loop Communication - Verbal [Salik 2020]

- Communication model based on **verbal feedback** to ensure proper team understanding of a meaningful message
  - originated from military radio transmissions
- Three-step process
  1. Sender sends message to receiver, utilizing receiver's name if possible
  2. Receiver acknowledges receipt of message verbally and seeks clarification if needed ("read back and verify")
  3. **Sender verifies that receiver correctly interpreted the message** (closes the loop)
- Reduces the risk of preventable errors in medicine
- Found to help staff complete verbal orders faster and more accurately

Closed Loop Communication - Electronic

- Similar to verbal, but message and acknowledgement are electronic
  - Advantages
    - Message is sent in written form and can be retrieved later for review
    - Acknowledgement can be recorded and stored
    - Timestamps
  - Disadvantage: More difficult to be certain of receiver's understanding
- Examples
  - Electronic critical laboratory value notifications
  - Electronic radiology critical result notifications
- Separate use of closed loop (not truly communications):
  - Close the loop on specimen collection positive patient identification via bar code scanning labels on collected specimens only to confirm collection

K121. Effective communication programs to support and sustain systems implementation

Effective Communication Programs

- Requires development and execution of a **Communication Plan**
  - Pre-defined agreement between parties on communication of information

			Mechanism (media)								Timing					
Information to Communicate	**Objective(s) of Communication**	**Approvals required**	**Face to face meeting (in person only)**	**Face-to-face meeting (with teleconferencing)**	**Documents delivered by email**	**Project Website**	**Phone Calls**	**Overhead speaker reminders**	**Printed memos to mailboxes**	**Fax**	**Trigger**	**When (immediate vs. periodic)**	**Frequency**	**Target Audience**	**Owner (Person Responsible for Communication)**	**Deliverable(s)**
Project status	Inform leaders about activities, progress, completed items, issues and project health	None		x (Steering Committee)	x	x					None	Periodic	Monthly	Members of Steering Committee	Project Manager	• Project Health Placemat • Meeting agenda • Meeting minutes • Other supporting documentation
Training Event Reminders	Remind all staff to sign up for training events	Yes (Project Manager must approve first communication prior to dissemination)			x	x		x	x		None	Periodic	• 8 weeks before go-live • 6 weeks before go-live • 4 weeks before go-live	All Staff	Training Manager	Reminder documentation
Reminders for staff who have not trained close to go-live	Target staff and their supervisors who have not trained within 2 weeks of go-live of loss of privileges without training	None			x		x		x		If there are any staff not yet trained as of two weeks prior to go-live	Immediate	Two weeks before go-live and every day until go-live	Untrained staff and their supervisors	Training Manager	• Written documentation on potential loss of privileges to untrained staff • Phone calls to supervisors • Notification to Project Manager

Effective Communication Programs

Also includes

- Constraints on communication (who, how, when)
- Escalation process for urgent issues
- Change control for the communications plan
- Flow charts of communication
- Mechanism for receipt, review and response to feedback
- Approval process

Stakeholder register (discussed in section on Project Management) helps drive development of this document for a project.

Who	Person(s) who will receive the communication
What	Information that will be communicated
Where	Expected or possible locations of persons receiving the communication (work vs. home, facility, department, unit, etc.)
When	Timing of the communication (immediate vs. periodic, frequency)
Why	Triggers (reasons) for the communication
How	Method/medium of communication

Communications to Support / Sustain Systems

- Supporting and sustaining change is hard *(see change management lecture)*
- Communication strategies to support successful change [Batti 2019]
  - Be specific, early and often about why the change was needed and who it affects
  - Choose the correct channels and people to communicate to build trust
  - Communicate through multiple channels
  - Answer “what’s in it for me” relevant to the affected users
  - Anticipate and address resistance
  - Incorporate feedback
  - Don’t be afraid to repeat yourself (often)
    - Rule of seven – people need to hear a message 7 times to incorporate information into action

K122. Writing effectively for various audiences and goals

Writing Effectively for Various Audiences / Goals

Written communication = Lean Channel of communication

- CAUTION: easy for reader to misinterpret (negatively)

Write clearly and simply

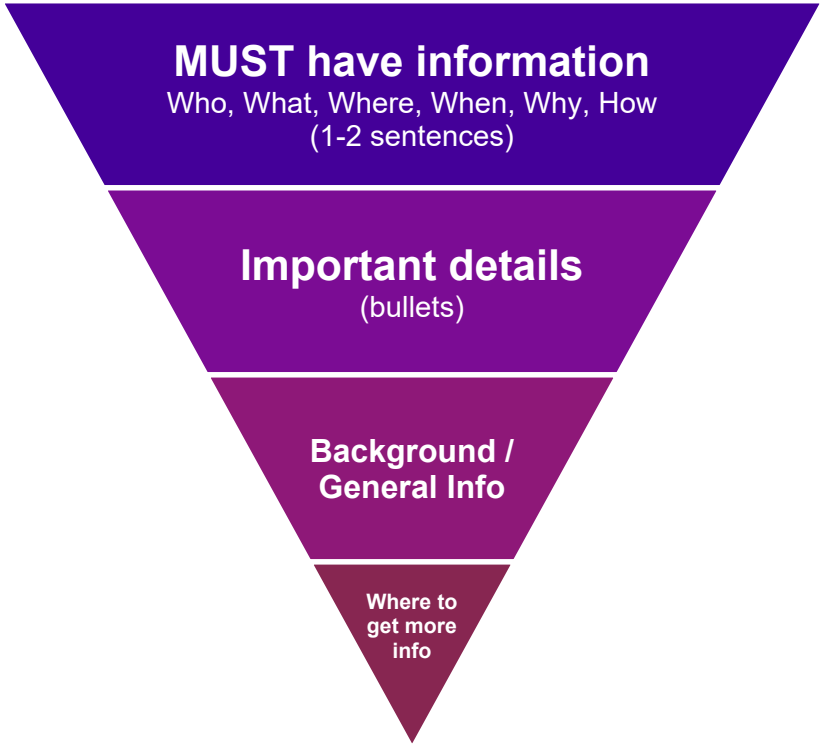
- Average adult American comprehends at 8th grade level, some say 5th grade level

Make use of **bold**, underline, highlight, font color for key concepts in your writing, and…

White space is also very effective!

Inverted Pyramid Method

- A.k.a. inverted triangle method
- Developed and used by journalists
- **Most important stuff at the top**
- Minutia at the bottom



Writing Effectively for Various Audiences / Goals

Do not write paragraphs, use bullets

Use SBAR – not just for verbal communications

- Background is BRIEF events leading to the situation
- http://www.ihi.org/resources/Pages/Tools/sbartoolkit.aspx

Situation

- Several physicians have called and stated that patients are getting bizarre creatinine levels. Patients who had a creatinine of 1.0 mg/dL yesterday now have creatinines of 10.0 mg/dL.

Background

- The creatinine test was upgraded at 6 am this morning. The method was replaced, and creatinines now reported with 2 significant digits instead of 1 (0.8 mg/dL is now 0.83 mg/dL).

Assessment

- Need to investigate the changes made with the upgrade.

Recommendation

- Review the records for the specific patients in both the EHR and LIS to find and fix error.
- After error is resolved, determine how this was missed during pre-go-live testing.

Writing Effectively for Various Audiences / Goals

- Check for errors – spelling, grammar, typos
- If the topic is difficult, choose a richer form of communication (phone call, in person)
  - If written communication is only option, then have another person read the message before sending it

Example of Poorly Written Communication

Hey,

As you know we had a meeting last week regarding the situation we discussed the week before, and many members of the team thought that we should talk to you about it to get your feedback. The new equipment is working well, but we have some concerns about some of the options and whether they will work for that area in the hospital. Since I haven't had much time lately, my colleague has been taking over most of my duties. I already have some feedback, so you don't have to attend the meeting if you don't want to. Just let me know what you want to do.

Sincerely,

Fred

Example of Poorly Written Communication

Hey,

As you know we had a meeting last week regarding the situation we discussed the week before, and many members of the team thought that we should talk to you about it to get your feedback. The new equipment is working well, but we have some concerns about some of the options and whether they will work for that area in the hospital. Since I haven't had much time lately, my colleague has been taking over most of my duties. I already have some feedback, so you don't have to attend the meeting if you don't want to. Just let me know what you want to do.

Sincerely,

Fred

PROBLEMS

- Is this addressed to me?
- What situation?
- Which team? Who are the members?
- What equipment?
- What area?
- What does Fred's duties being covered have to do with anything else in this email?
- If the team wanted my feedback, then why are they telling me that I don't need to attend the meeting?
- ***I'm so confused…***

Example of Well Written Communication

Dear Alexis,

The specimen collection positive patient ID team discussed at our meeting last week the unexpectedly large number of duplicate specimen labels printing in the specimen processing area. The vendor representative for this project cannot identify the source.

What the team needs from you:
Please examine the labels and propose possible sources of the duplication.
Deadline: tomorrow, October 1.

The new label printing equipment is otherwise working well, but we have some additional concerns that we would like to discuss with you at our next project meeting on October 7th. Please let us know if you can join us.

Sincerely,
Fred

Example of Well Written Communication

Dear Alexis,

The specimen collection positive patient ID team discussed at our meeting last week the unexpectedly large number of duplicate specimen labels printing in the specimen processing area. The vendor representative for this project cannot identify the source.

What the team needs from you:
Please examine the labels and propose possible sources of the duplication.
Deadline: tomorrow, October 1.

The new label printing equipment is otherwise working well, but we have some additional concerns that we would like to discuss with you at our next project meeting on October 7th. Please let us know if you can join us.

Sincerely,
Fred

Poor example:

106 words

Well written example:

98 words

- Clear
- Appropriate use of font colors, bold, underline and **white space**

K132. Intergenerational communication techniques

Communication for different generations

1901-1924	1925-1945	1946-1964	1965-1980	1981-1996	1997-2012	2013 - 2020s
Greatest generation	**Traditionals (Silent Generation)** • Loyalty, Duty, Patriotism, Delayed Gratification, Sacrifice	**Baby Boomers** • Optimism, Idealism, Devotion, Competitive, Leave mark	**Generation X** • Skepticism, Disillusionment, Self-reliant, Work-life Balance • Efficiency (teach to the test), prefer self-directed activities	**Generation Y (Millennials)** • "Digital Natives" • Hands-on learners, multitaskers, very tech-savvy • Crave interaction, diversity, rewards, feedback	**Generation Z**	**Generation alpha**

Generation [Longenecker 2016]

- group of people born in the same time frame, usually ~20 years
- Share common experiences that shape beliefs, values, preferences

Despite generational differences, communication modes are quite similar!
AHA 2014

Table 6: Modes of Communication Used by Each Generation[42]

Traditionalists	Baby Boomers	Generation X	Millennials
Desktop computer (87%)	Desktop computer (81%)	Desktop computer (75%)	Desktop computer (71%)
Landline phone (87%)	Landline phone (84%)	Landline phone (81%)	Landline phone (67%)
Fax (78%)	Fax (74%)	Fax (65%)	Fax (52%)
Mobile/cell phone (73%)	Mobile/cell phone (66%)	Mobile/cell phone (65%)	Mobile/cell phone (46%)
Laptop computer (43%)	Laptop computer (44%)	Laptop computer (44%)	Laptop computer (26%)
PDAs with phone and Internet (11%)	PDAs with phone and Internet (15%)	PDAs with phone and Internet (15%)	PDAs with phone and Internet (6%)

Source: Adapted from "Generational differences in the workplace" by Tolbize, A., 2008.

Communication for different generations

- AHA Managing an Intergenerational Workforce [AHA 2014]
- Develop tailored communication strategies that cultivate generational understanding and sensitivity

Table 5: Communication Styles of Each Generation

	Traditionalists	Baby Boomers	Generation X	Millennials
Style	Formal	Semiformal	Not so serious; irreverent	Eye-catching, fun
Content	Detailed, prose-style writing	Chunk it down but give me everything	Get to the point (what do I need to know?)	If and when I need it, I'll find it online
Context	Relevant to my security, historical perspective	Relevant to the bottom line and my rewards	Relevant to what matters to me	Relevant to now, today and my role
Attitude	Accept and trust authority and hierarchy	Accept the "rules" as created by the traditionalists	Openly question authority, often branded as cynics and skeptics	OK with authority that earns their respect
Tactics	Print, conventional mail, face-to-face dialogue or by phone, some online information/ interaction	Print, conventional mail, face-to-face dialogue, online tools and resources	Online, some face-to-face meetings (if really needed), games, technological interaction	Online, wired, seamlessly connected through technology
Speed	Attainable within reasonable time frame	Available, handy	Immediate, when I need it	Five minutes ago
Frequency	In digestible amount	As needed	Whenever	Constant

Source: Adapted from a Deloitte Consulting and the International Association Business Communicators study found in The 2020 Workplace *by Meister, J. and Willyerd, K., 2010. New York: HarperCollins. Copyright 2010 by Jeanne C. Meister and Karie Willyerd.*

K134. Adult learning theories, methods, and techniques

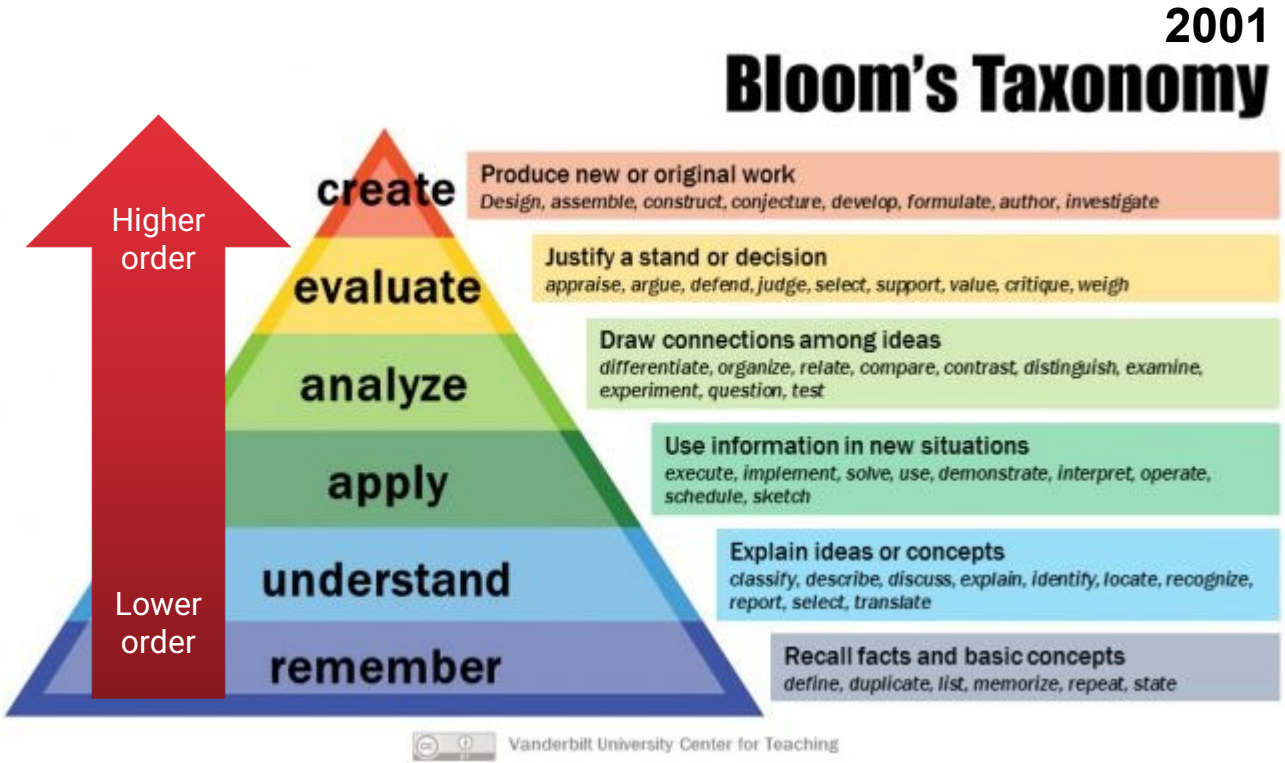
Adult Learning Theories [Walters-Threat L, AHIC Unit 5, Module 5, 1]

- Adult learning is important for Clinical Informatics
  - **Providers** must be well-educated on the technology they use
  - **Patients** may need to learn how to use the patient portal
- **Learning theories** explain how we learn and how to approach teaching

Learning Domain	Description	Related Learning Theory	Role that establishes learning goals
Cognitive	Emphasizes knowledge, intellectual skill or subject matter	Bloom's Taxonomy	Educator
Affective	Focuses on attitudes and beliefs	Andragogy and related	Learner
Psychomotor (or Behavioral)	Highlights practical application (e.g., role playing, simulations, teach-backs)	Transformative (Transformational) Learning	

Cognitive → Bloom's Taxonomy

- Originated in 1956 and later updated in 2001
- Categorizes educational goals in order of complexity
- Emphasizes mastery (not memorization)
- Lower order skills just as important as higher order skills
- Armstrong 2010



Affective → Andragogy and related theories

- **Andragogy**: the art or science of teaching adults (Merriam-Webster)
- **Andragogy theory**: Postulates that adult learners are different from children because adults…
  - Need to know why they need to learn something
  - Are more self-directed
  - Respond to experiential teaching due to their higher number of experiences
  - Are more ready to learn material that helps them with real-life situations
  - Are more life-, task- or problem-centered than children (who are subject-centered)
  - Experience strong focused motivations (both internal and external)

Psychomotor → Transformative Learning

- Learning that challenges the learner's established perspectives, resulting in "transforming" their thinking based on new information
  - Shifting world view as they obtain new information through critical reflection [WGU 2007]
  - 2 components (see below)
- **Instrumental learning**
  - Task oriented problem solving
  - Evaluation of cause-and-effect relationships
- **Communicative learning**
  - How people communicate their feelings, needs and desires
- Transformative Learning in Practice
  - Learn about new perspectives, identify and challenge assumptions, discussion

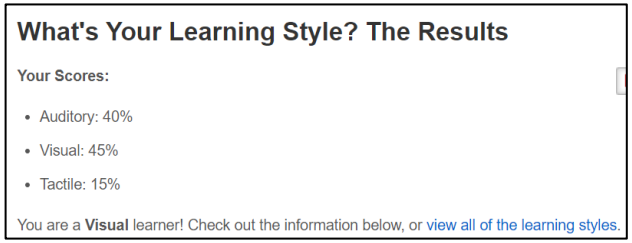
K135. Teaching modalities for individuals and groups

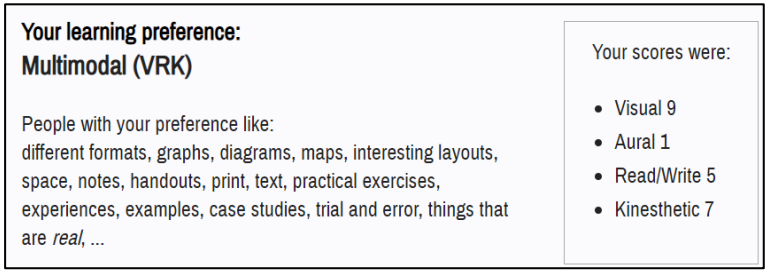
Learning Styles - Individuals

- Learning styles influence behavior and learning
- Learning styles should be matched to appropriate learning strategies
- **VARK model**

Style	In order to learn, the learner must…
Visual	See it (images, videos, maps)
Aural (Auditory)	Hear it (listening, repeating, speaking)
Read/write	Read or write words (note-takers)
Kinesthetic	Have a hands-on approach

- **Learn your style**
  - **Results can be questionnaire-specific**
  - **VARK Questionnaire**
  - **What's your learning style?**





Teaching Strategies – Individuals and Groups

Strategy	Description
Backward Design [Vanderbilt 2021]	• Learning outcomes (goals/objectives) → process to achieve outcomes → plan content • More commonly used now than forward design
Forward Design	Plan content → process to achieve outcomes → learning outcomes
Think-Pair-Share	1. Learner **thinks** individually about question/problem 2. Learning **pairs** with classmates to think about the problem 3. Learner **shares** ideas with classmates
Flipped Classroom	• Students study material independently before any classroom instruction on the topic • Requires a **lot** of student discipline
Problem-based Learning (PBL)	Teaching based on learners investigating complex real-world problems rather than presentation of facts by educator
Universal Design for Learning [CAST 2018]	Framework to optimize teaching based on how someone learns through engagement (why), representation (what) and expression (how)

Learning (Teaching) Strategies for Health IT

- EHR Simulation [Mohan 2017, Milano 2014]
  - **Gamification**: form of experiential learning where EHR simulation is turned into a game
- ONC 2019
  - Role-based training
  - Process-based training
  - Super Users
- Learner-centric approach
  - **Tailored learning**: skills of learners are assessed and used to determine the type and extent of training
- Train close to the implementation (use) of the system
- EVALUATE TRAINING

K136. Methods to assess the effectiveness of training and competency development

Competency Assessment

- Assessment of a learner's capabilities compared against the learning objectives
- Quantifies the gap between the learner's ability and the objectives
- Examples
  - Pre-test vs. post-test
  - Projects
  - Multiple-choice tests
  - Summarization (written or oral)
  - Observations of the learner performing the task
    - E.g., **Objective Structured Clinical Examination (OSCE)**

Competency evaluation methods

Methodology	Description
Kirkpatrick's Four-level Training Evaluation Model	Model identifies four (4) levels of learning outcomes
Outcomes Framework	Seven-level outcomes framework designed for planning and assessing continuing medical education activities; also used in nursing continuing education activity planning
Formative vs Summative Evaluation	Formative: methods used to uncover misconceptions, difficulties or disparities (eg, surveys or clicker questions) Summative: evaluation of training at the end of an instructional period (ie, observation or simulation test)

Kirkpatrick Model [Kirkpatrick 2021]

Level of outcome	Name	The degree to which learners…
4	Results	Achieve the targeted outcomes as a result of training, support and accountability
3	Behavior	Apply what they learned when they are back on the job • Encourage – Reward – Monitor – Reinforce
2	Learning	Acquire the intended knowledge, skills, attitude, confidence and commitment based on their participation in training
1	Reaction	Find training favorable, engaging and relevant to their jobs

Outcomes Framework [Moore 2009, AACME 2013, MCV 2016]

- Intended for continuing education activities (e.g., CME)
  - Focus on knowledge that can be used in practice
- Start with highest level (level 7) then work your way backwards to…
  - Find appropriate learner outcomes
  - Address specified gaps
- Must take health care professional's level of learning into account

Outcomes Framework [Moore 2009, AACME 2013, MCV 2016]

Level	Name	Description	Examples
1	Participation	# participants	Attendance Records
2	Satisfaction	Degree to which participants' expectations were met	Surveys
3a	Learning: Declarative Knowledge	Degree to which participants declare what the educational activity intended for them to know	Pre and post tests Self-reported
3b	Learning: Procedural Knowledge	Degree to which participants state how to do what they were intended to learn	Pre and post tests Self-reported
4	Competence	Degree to which participants can demonstrate the intended knowledge in an educational setting	Observation
5	Performance	Degree to which participants perform the intended tasks	Observation
6	Patient Health	Degree to which patients' health statuses improve	Metrics
7	Community Health	Degree to which health status of community improves	Epidemiological data

Formative vs. Summative Evaluation

	Formative Evaluation	Summative Evaluation
Characteristics	• Occurs **mid**-chapter/course (while knowledge still forming in learner's mind) • Check for instructor and student • Instructor can do mid-course correction if learner is not demonstrating appropriate understanding • Incremental step (usually not graded); point value not critical	• Occurs at **end** of chapter/course • Used as **competency assessment**: what is students' understanding of course and have learning objectives been met • Often results in grades; high point value
Examples	• Quizzes, homework, worksheets • Mid-rotation evaluations • Brief surveys • Classroom assessment techniques (CAT) • **CIBRC Course Questions**	• End of term or qualifying exam • Capstone project write-up; paper • Instructor rating of student performance in observation-based assessment • In-depth post-course survey • **Clinical Informatics Board Exam**

Question

Training of end-users on a new information system should be completed…

A. As early as possible prior to roll out of the new system to give users as much time as possible to become familiar with the new system before go-live

B. Only following the roll out of the new system, “after the bugs are worked out,” to prevent wasting staff time

C. Prior to roll out of the new system so that staff are prepared to use the new system at go-live, but not too early so that they don’t forget their training on the new system

D. On a timeframe according to seniority of staff, so that staff who have been employed the longest should be trained first

Answer

Training of end-users on a new information system should be completed…

C. Prior to roll out of the new system so that staff are prepared to use the new system at go-live, but not too early so that they don't forget their training on the new system

In general, the optimal timing to train users of a newly implemented clinical information system is shortly prior to roll out of the new system, which is considered "just in time" to imprint new learning and for the staff to be confident to use the system at roll-out.

- Depending on the number of users that need to be trained, this could be anywhere from two weeks to four months prior to go-live.
- For any training done more than two months prior to go-live, quick refresher courses may need to be scheduled.

Knowledge acquired very early prior to roll out will have extinguished by the time the system goes live, leaving users frustrated at go-live. Longevity of employment usually is not a consideration for timing of staff training on use of a new system, although timing of training may be role dependent or department dependent if a system roll out will be gradual (so train first the users of a department or ward that will go live with the new system first).

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That’s a wrap!