USING CONSOLIDATED FRAMEWORK FOR IMPLEMENTATION RESEARCH (CFIR) TO IMPROVE INFORMATION GOVERNANCE (IG) IMPLEMENTATION IN HEALTHCARE

By

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This is to certify that the Master's Capstone Project of

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Abstract

Health Information Technology (HIT) has transformed healthcare into a data rich industry. However, the growing amount of data and information generated brought unintended consequences to this inherently complex ecosystem. Healthcare organizations are now facing challenges to ensure data trustworthiness and its efficient management. Realizing the need to control and protect their information asset, information governance (IG) has been gaining traction in healthcare in the past decade. Thanks to industry leaders' effort on advocating the necessity of IG, it is no longer a new concept. However, recent evidence show organizations are struggling to apply IG frameworks into their practices regardless of implementation effort. This indicates the effectiveness of IG implementation requires much more attention.

To evaluate the process of implementation itself, frameworks from implementation science research provide solutions. Among them, Consolidated Framework for Implementation Research (CFIR) has been used in a wide variety of studies. It enables a systematic evaluation by establishing a comprehensive list of contextual and intervention factors thought to influence implementation and effectiveness. This paper uses CFIR to guide the understanding of the multilayered and dynamic IG implementation in healthcare. Relevant literatures are reviewed, synthesized and organized into applicable CFIR constructs. An interview guide is developed based on the CFIR framework and context related to IG implementation.

This paper demonstrates the feasibility of applying CFIR to identify the barriers, enablers as well as strategies used during the changes in an IG implementation process. Qualitative and quantitative research will be required to test the validity and the evaluation of this framework in health IG implementation.

Introduction

The healthcare industry is at a pivotal time as the Electronic Health Records (EHR) adoption reaching to its maturity and the continuous widespread of Health Information Technology (HIT).[1] Shifting the focus to harnessing big data, healthcare leaders are looking for data driven solutions to transform their business models and drive evidence-based decision making. However, since the healthcare ecosystem is inherently complex and highly regulated, the enormous amount of data and information generated has created unintended consequences for most healthcare organizations. To name a few, inefficient management of data and its sources, misuse of technologies, as well as workflow changes have all been contributing to information integrity issues.[1-3] As a result, contradicting versions of truth is inevitable paralyzing the ability of leaders and clinicians to make informed decisions. Worse, lower care quality, costly breaches and e-discovery and ineffective information sharing are on the rise.[1, 4, 5] The transition to value-based care and payment system created the market pressure resulted in numerous mergers and acquisitions, which compounds to the existing challenges with data management and Health Information Exchange (HIE) expansions.[4, 6, 7] These rapid changing demands reflect the need for information trustworthiness. When World Health Organization (WHO) compiled health related data, only 18% of its members were able to provide reliable quality data, indicating the need for better governance on a global scale.[3]

Organizations are realizing their most valuable information asset could turn into liability without better control and protection. Thus, healthcare industry has reached consensus Information Governance (IG) is a business imperative to succeed in the fast-changing digital environment.[8] Additionally, researchers have been advocating for strengthening IG practice on a global scale to maximize the potential of secondary use of EHR data in medical discovery.[9, 10]

Several definitions of IG are recognized by the healthcare sector. Information Governance Initiative (IGI) defines "Information governance is the activities and technologies that organizations employ to maximize the value of their information while minimizing associated risks and costs."[11] The definition from Garner is thought to be the most widespread in all industry: "the specification of decision rights and an accountability framework to ensure appropriate behavior in the valuation, creation, storage, use, archiving and deletion of information. It includes the processes, roles and policies, standards and metrics that ensure the effective and efficient use of information in enabling an organization to achieve its goals."[12] Drawing the IG definition from Garner and American Records Management Association (ARMA), it is defined by the American Information Management Association (AHIMA) as "an organization wide framework for managing information throughout its lifecycle and for supporting the organization's strategy, operations, regulatory, legal, risk, and environmental requirements."[13] These definitions describe the scope of IG, how to accomplish IG and what it aims to achieve.

Thus, IG can be understood as the framework which guides the efficient use of information and communication technologies to process organizational information and create knowledge for healthcare decision makers.[1] Effective IG programs are policy-focused through accountability from all stakeholders and that their behaviors are influenced by clear guidelines. It ultimately controls the people, the processes, and the technology of information requirements to balance the value and risk of organizational information.[3, 14]

Background

Since 2013, AHIMA has been spearheading the driving IG adoption in healthcare.[15] Other companies and non-profit bodies such as ARMA, Association for Intelligent Information

Management (AIIM), Cohasset Associates and Iron Mountain are also fundamental to health IG by developing and promoting standard health IG practices.[8, 16] Although IG is no longer a new concept in healthcare today and leaders are well aware of the necessity of IG, its advancement to maturity requires much more effort. According to the first healthcare IG benchmarking survey in 2014,[17] 43% of the participating organizations initiated IG programs. Similarly, in the 2017 survey results, 33.2% participating organizations started IG programs, 9.8% less than the 2014 result. This decrease can be explained by the different surveying demographics. However, since the surveys' demographic measures differ significantly (i.e. inclusion and exclusion of categories), this interpretation is based on the understanding of the survey content. It is worth noting of those whom initiated the program, only a small population (11% and 3.4%) realized substantial benefits. Further, both results indicated 24% respondents were not aware of their organizations' IG status. 11% and 21.1% (2014 and 2017 respectively) thought IG was not needed.[15, 17] Overall, the IG adoption status in healthcare remains about the same since 2014. Table 1 shows the detailed comparison between 2014 and 2017 health IG status.

Healthcare Information Governance Adoption Status Comparison Between 2014 and 2017		
Measures	2014	2017
Program initiated; substantial benefits realized	11%	3.4%
Program initiated; some benefits realized	19%	6%
Program initiated; benefits not yet realized	13%	5.4%
Efforts underway (informal program)	N/A	18.4%
Recognized need; no formal program or exploring options	22%	21.8%
No recognized need/interest	11%	21.1%
Don't know	24%	24%

Table 1. Comparison of healthcare information governance adoption status[15, 17]

The need for IG and the summative outcomes (assessing the positive or negative outcome of IG implementation) have been well studied by researchers and industry experts. However, survey results indicate healthcare organizations are struggling to apply IG frameworks into their

practices regardless of implementation effort. This leads to a question: How to gain a better understanding of what are needed for IG successful implementation? The missing link is formative evaluation. In implementation science, it is a measurement methodology described as "an assessment process to identify potential and actual influences on the progress and effectiveness of implementation efforts."[18] This approach enhances the implementers' understanding of the complex factors influencing their process which in turn, improves implementation effectiveness.

In a healthcare setting, formative evaluation in implementation research has been used to help implementing research findings into practice to improve clinical care.[18, 19] There are no known IG studies in healthcare which apply implementation science frameworks to evaluate its implementation. This paper aims to understand the complex dimensions of IG implementation by demonstrating the use of Consolidated Framework for Implementation Research (CFIR) to improve implementation effectiveness.

Consolidated Framework for Implementation Research (CFIR)

CFIR is categorized as a determinant framework with the objective to understand and explain factors (individual or organization) which influence implementation outcomes.[20] CFIR was developed by consolidating concepts from 19 different theories, mainly within healthcare. It provides an extensive list of constructs which may act as facilitators and barriers during implementation efforts.[21] CFIR has been used in a wide range of studies because this flexible framework can be tailored to different settings across multiple contexts.[19, 21]

Enterprise-wide IG implementation is a multifaceted and dynamic phenomenon. CFIR offers a comprehensive framework which systematically evaluate all possible contextual and intervention factors that influence implementation and effectiveness. Specifically, it addresses the change

implications in IG practices. Its development considered the dynamic relationship between individuals and their organization and how that relationship impact the changes in their behavior.[19, 20] This approach aligns with the purpose to explore the barriers and enablers of IG implementation to enhance implementation efforts.

CFIR has five domains and 39 dynamic constructs. Their relevance to IG implementation are discussed in the Findings section. Figure 1 demonstrates how Damschroder et al. depicted the complex interactions between domains to influence implementation effectiveness.[19]

I. Intervention Characteristics (8 constructs): Intervention features

II. Inner setting (12 constructs): Factors within the implementing organization

III. Outer Setting (4 constructs): External contexts or environment

IV. Characteristics of Individuals (5 constructs): Individuals involved in the implementation

V. Process (8 constructs): Implementation strategies

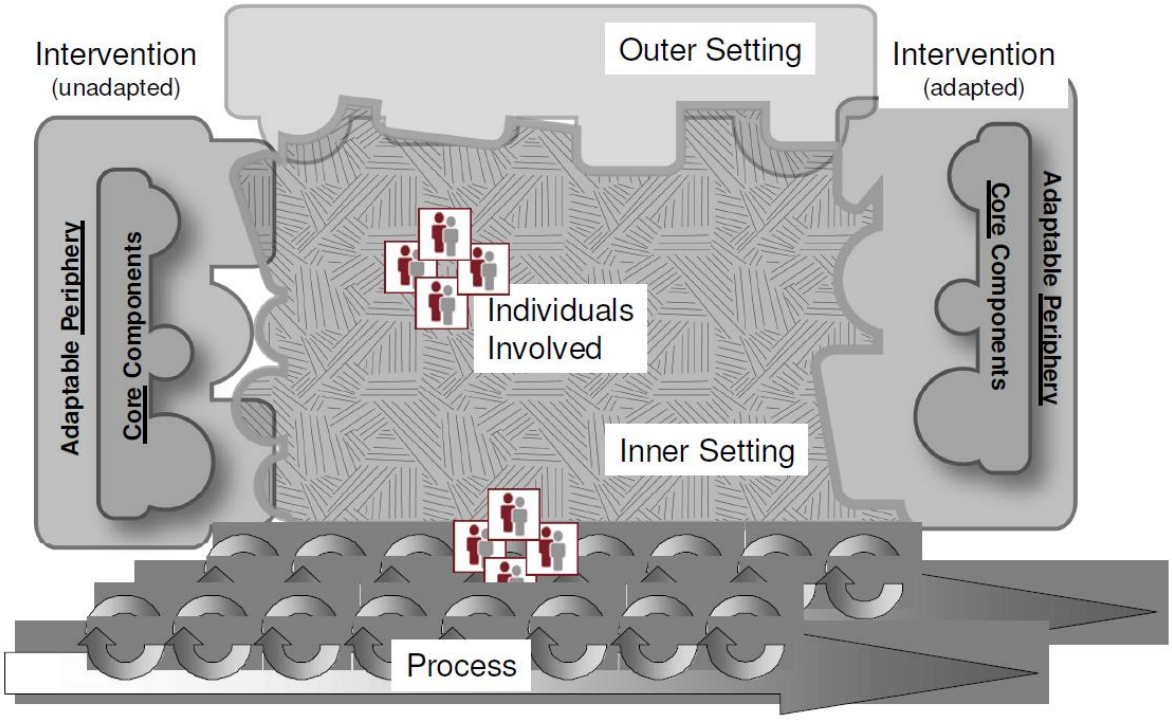

Figure 1. Domains of the CFIR and their relationships[19]

Methodology

To conduct a thorough literature review on the current state of IG adoption in healthcare, EBSCOHost, Ovid MEDLINE and PubMed were searched using keywords “health information governance”, “information governance implementation” and “healthcare governance” for published peer reviewed journals and articles in English language. Snowballing search method was used to discover new literatures. The results were limited to the recent five years to make sure the issues studied were up to date with the current healthcare environment. Relevant results were not exhaustive. Specifically, “information governance implementation” did not result in any relevant searches related to healthcare. Due to the trivial number of articles found, studies of healthcare Information Technology Governance(ITG) and Data Governance (DG) were also included as they are essential subdomains of IG. To ensure the understanding of IG and its scope, Google search engine was also used which resulted in several industry white papers, toolkits and guidelines. IG studies in sectors other than healthcare were excluded as the purpose is to understand the unique barriers and facilitators in a healthcare setting. Articles containing redundant insights or excess personal opinions without sufficient warrant were also excluded. Most of the case studies found were published by AHIMA. This is perhaps due to AHIMA has been taking an active role in advocating IG adoption since the concept was still new to most entities in the healthcare sector.[2] CFIR concepts and its use were researched via PubMed search and its official website.

All relevant article results were downloaded as full texts. They were reviewed, synthesized and organized into applicable CFIR constructs. The rationales are discussed illustrating how this framework can be applied in the context of IG in healthcare. Finally, an interview guide is

developed as a tool for healthcare leaders and researchers to advance IG implementation in a variety of settings and contexts.

The research objectives are as follows:

1) To identify barriers and enablers of IG implementation in healthcare
2) To explore tactics used to overcome the challenges during the changes
3) To understand the variables and their relationships which occur in IG implementation
4) To demonstrate the feasibility of applying CFIR to IG implementation in healthcare

Findings

DOMAIN I: IG PROGRAM CHARACTERISTICS

I-A. Intervention Source

Stakeholders' perception about whether the intervention is externally or internally developed can impact implementation in different ways.[22] Internally developed intervention can be referred to IG programs initiated by executives (program sponsors) or organizational leaders. External intervention can be understood as IG services offered by outside companies. Damschroder et al. found if the decision-making process lacks transparency for programs coming from outside the organization, a failure in implementation may be resulted. Alternatively, externally developed programs that are well tailored to the organization has a positive impact on adoption.[19] To this extent, whether IG programs are internally initiated or from external sources, ensuring IG strategies to align with company objectives and goals can increase program effectiveness.[7] The key to this construct is the stakeholders' level of participation in decision-making. Consensus reached by groups boost engagement and adherence by increasing sense of ownership.[6, 19]

I-B. Evidence Strength & Quality

Gauging stakeholders' perspective on the quality and validity of evidence to support their belief of desired outcomes helps to increase program engagement.[19] Evidence supporting IG practices

may be internal (i.e. quantifying project benefits; success stories) or external (i.e. influential entities' white paper and resources; research studies). The more evidence provided coupled with higher source credibility, the more likely for organizations to take up adoption.[19] Executive sponsorship have been reported as a facilitator by early adopters who have shown success in their programs.[2] To gain key stakeholder support, implementation leaders should seek to understand the executives' perspective on IG as well as the supporting evidence needed for workforce buy-in.[5, 23] For example, a project to implement new retention policy resulted cost saving in storage can be a convincing evidence to get support in program expansion.

I-C. Relative Advantage

This construct's focus is the stakeholder's perspective to compare an alternative or similar solutions to the intervention being implemented.[24] When people see its usefulness and how it is beneficial over other options, they are more likely to adopt. IG framework can be considered as either existing or non-existing. Therefore, there is no similar or alternative option to IG. It is believed by most healthcare leaders to be essential and the absence of this framework is no longer an option.[1, 8] This firm believe to its need is defined by the tension for change construct as part of the inner setting domain described below.[24] Therefore, relative advantage may be less relevant in most evaluation when assessed as an entire framework. However, it can be applied to specific subset of IG initiatives such as decisions to contract with consulting firms verses in-house development of an IG program or assessing the options to invest new technologies as part of IT governance.

I-D. Adaptability

Adaptability refers to how well an intervention can be adapted, tailored, refined, or reinvented to meet local needs.[22] The flexibility of IG framework to adapt to the company environment as well as during different program phases can be positively associated with implementation.[19] While

implementation leaders are often held back by the lack of stakeholder buy-in and limited resources, identifying organizations' unique IG drivers to fit the current needs has been identified as a solution.[25] As Egelstaff and Wells stated in their paper in discussing DG, there is no single universal data governance framework that is suitable for all organizations.[26] Just as DG will continue to evolve as new technologies, policy mandates and organizational restricting emerges, IG framework will evolve as well.[26] Thus, the readiness and the ability of an organization to refine and reinvent IG framework determine the direction of IG adoption.

I-E. Trialability

Trialability refers to the organization's ability to trial the intervention on a small scale and if necessary, capable of reversing changes.[22] Testing pilot programs enable stakeholders to gain experience, increase their coordination and opportunities to refine strategies.[19] In IG implementation, piloting means initialing efforts on a smaller scale as it takes time to be fully implemented enterprise wide. Most organizations start with small and easily achievable projects to gain stakeholders' recognition with positive results. For example, a hospital system decided to start with standardizing legal medical record and designated record set and updating retention schedules from the Health Information Management (HIM) department.[27] The project gained success in reducing risks and costs associated with ill-defined terms while increasing staff productivity. As a result, the program expansion was accelerating at a faster rate than expected.[27]

I-F. Complexity

The perception of difficulty of an intervention depends on many attributes: duration, scope, radicalness, disruptiveness, centrality, and intricacy and the number of steps involved. [22] The complexity of IG in healthcare can be well described from all of these aspects. Perceived complexity on IG framework has a negative impact on effective implementation.[19] IG involves mostly "administrative change", meaning behavioral changes which effect structures or

processes. It also has a technical change component such as implementing an Enterprise Content Management (ECM) technology to support IG efforts. Administrative change is perceived to be more difficult than technical change. Though these changes are intertwined with IG efforts. Establishing clear and simple implementation plans and schedules is thought to its minimize unintended consequences.[19]

I-G. Design Quality & Packaging

Well packaged (bundled, presented, assembled) IG programs are likely to receive positive attitudes from stakeholders, which in turn promotes better adoption.[19] Specifically, IG programs should be well planned and communicated, meaning, clear structure and goals are set, steps to achieve the goals are determined and strategies are planned for unanticipated obstacles, and materials and tools needed are easily assessable. The workforce sees management is prepared, ready and they will be well supported, which will translate into perceived program quality. When quality is perceived as poor, negative outcomes such as decreased staff satisfaction and practice adherence occur.[19]

I-H. Cost

Cost is referred to the intervention cost and implementation associated cost which may include investment, supply, and opportunity costs.[22] It should be noted resources dedicated to IG and its sustainability such as money and time are not included here, rather belong in the available resources construct. In IG practices, cost associated may be additional data storage, automated classification tools and other technologies. However, the amount spend on investments does not directly correlated to efficiency and is negatively associated with implementation.[19] Thus, IT and business leaders must collaboratively decide on the new technology or tools invested while considering its implication in compliance, value and risk to the organization along with workflow changes and staff competencies to use those tools.

DOMAIN II: OUTER SETTING

II-A. Patient Needs & Resources

The ultimate goal for all processes and decisions carried out by healthcare organizations is the well-being of patients and the population. Thus, successful implementation effort occurs in patient-centered organizations.[19] Effective IG implementation can be anticipated by the extent of organizations' effort on: offering resources and choices to patients, addressing their barriers, minimizing costs and care complexity and patient satisfaction.[19] IG essentially drives clinical and financial outcomes as well as improving coordination of care. For example, one of the first IG effort organizations focus on is reducing patient matching errors to increase information integrity, such as incorrect patient data entries and duplicate records. Employees tend to assume patient information in the systems can be trusted for clinical care, while in fact, error rates are higher than they should be.[4] Employees' awareness is the prerequisite of paying attention to the potential errors and correcting them at data sources. Thus, the more workforce and leadership understand and prioritize their customers' needs and preferences, the more team effectiveness it would promote towards program goals.[19]

II-B. Cosmopolitanism

Cosmopolitanism assesses how well an organization is externally networked with other organizations.[19] Leaders should engage and encourage staff participation in professional affiliations, attending discipline specific conferences, external trainings and keeping updated with current research.[3] Since IG adoption is still somewhat in its infancy, outside support is critical to help guide the implementation efforts and increase staff readiness. For instance, AHIMA and Healthcare Information Management and Systems Society (HIMSS) are most recognized sources for reliable IG guidance including educational programs, guidelines, toolkits and practice briefs for IG professionals in healthcare.[8] These "external boundary spanning"

activities could accelerate the pace of IG programs which in part, due to new knowledge promoting awareness, self-confidence and commitment to change.[19] However, it is possible for cosmopolitanism to hinder implementation when perceived IG program benefits are not apparent.[19] Thus, it is important to recognize success stories as well as address implementation failures from other organizations.

II-C. Peer Pressure

Peer pressure refers to the mimetic or competitive pressure to implement IG; often due to other peers have already implemented or aiming for a competitive edge.[19] For example, healthcare organizations are accountable for their data even when it is stored by a vendor. Although concerned with the security risk, vendor practices are not always thoroughly researched prior to signing a contract due to limited time or resources.[28] Thus, vendors who are proactive about IG can be presented with leverage. According to the president from a release of information (ROI) vendor, by being an early adopter of IG and proving to hospitals their efforts, not only does it foster collaboration and information sharing, but also give them a competitive advantage in the market.[28] It is likely other vendors will start implementing IG due to competing organizations have already implemented such initiative. Similarly, healthcare providers may opt in to stay ahead. Further, pressure to adopt is strongly linked with late adopters when other hospital systems have already established IG programs.[19] From this aspect, cosmopolitanism is closely connected to peer pressure. Well-externally networked organizations are in a better position to accept the changes involved in IG implementation.

II-D. External Policy & Incentives

Healthcare changes are often driven by external forces. Organizations are well aware of the impact on policy and regulations (governmental or other central entities), external mandates, guidelines, pay-for-performance, and public reporting.[19] For instance, Medicare Access and

CHIP Reauthorization Act (MACRA) introduced the Quality Payment Program (QPP) in 2015, which rewards high quality and value Medicare eligible providers with payment increase while reducing payments to those who do not meet performance standards.[29] Data and information integrity is critical to improve care outcomes and accurately capture those performance for optimal payment. Organizations stay up to date on industry trends and mandates can leverage these changes to expand and drive the directions of IG practices.

DOMAIN III: INNER SETTING

III-A. Structural Characteristics

The structural characteristics of an organization include its social architecture, age, maturity, and size.[19] Damschroder et al. found a positive relationship between the degree of specialization (diversity of occupational types or specialties) and carrying out change due to the increase in knowledge base. Similarly, the number of participating departments in decision-making is positively linked to effective implementation.[19] AHIMA suggests the following organizational structure to promote engagement and participation:[25]

Executive (oversight from program sponsor)

Strategic (IG council)

Tactical (functional leaders and subject experts)

Operational (functional area super users)

It should be noted increased bureaucratic structure is a negative consequence of the age and size of the organization.[19] Structures should be reevaluated to counterbalance when these variables become barriers. Further, ensuring a healthy ratio of managers to total staff (administrative intensity) can help implementation by increasing leadership involvement and better allocating resources.[19] These variables correlate with leadership engagement and available resources constructs in inner setting.

III-B. Networks & Communication

This construct seeks to understand the nature and quality of social networks as well as formal and informal communications within an organization.[19] Damschroder et al. concluded there is no clear understanding of the interrelationship between formal and informal networks and its connection to other constructs. Until then, a grounded theory study with an inductive approach should be used to explore this construct.[19] Grounded theory is used when there is little known about a phenomenon. This constructivist approach often seeks to develop a theory about a process (specifically the action and interactions of people) related to a topic.[30]

In the context of IG practices in healthcare organizations however, this approach could be applied in straightforward ways. For example, the extend of employees' social network can be used to learn about staff stress level in facing mergers, employees carrying out new procedures, or clinicians' thought during information retrieval from the EHR. The actions of and the connections between entities (individuals, groups, hierarchies) cannot be understood without insights on a micro-level, which is commonly achieved by interviews and observations.[19, 30] Scott et al.[23] showed evidence which effective implementation requires organizations to acknowledge that people work within their individual and organizational relationships and must be aware of these relationships and the determinants motivated them. Overall, teamwork (stable team working together for longer period of time and low turnover), having clear defined roles, being well-informed on program decisions and quality communication all facilitate implementation.[2]

III-C. Culture

Culture, defined as the norms, values, and basic assumptions of an organization; influences how staff relate to each other, work environment as well as their organizations.[19] It may be characterized in four types: team, hierarchical, entrepreneurial and rational.[31] Culture is thought to be a critical factor in the strategic alignment of IG framework as it dictates workforce

behaviors and performance.[32] Since applying IG often requires substantial company-wide structural, process and technology changes, it is not surprising when change culture has been reported as one of the major barriers of IG implementation.[15] Assessing the types of culture at multiple levels of the organizations enhances its capability of managing change.[26] Further, cultural differences between organizations during mergers and acquisitions (M&A) is linked to its inefficiency or even failure.[33] Cultural shift on an organizational level requires more effort in communication to reduce resistance in the process of aligning technology solutions, workflow and policies.

III-D. Implementation Climate

III-D-1. Tension for Change

The more stakeholders perceive the current situation as intolerable or needing change, the more likely for changes to occur.[19] Recognizing the need for IG has been identified as a success factor as the tension for change increases when experiencing issues first-hand. According to the 2017 IG adoption survey, the top three drivers for implementing IG are: Analytics/Business Intelligence (29.7%), Data Quality/Trust (15.4%) and Performance Improvement (11%).[15] Assessing the needs perceived at a departmental level or individual level help implementation leaders to target opportunities and reduce resistance. Perhaps it is even more critical when it comes to late adopters or ones do not believe IG is unnecessary. Leaders are leveraging this factor to gain program recognition and support. For example, a hospital system created a standardized set of audit questions for each business unit to evaluate their compliance. By providing expectations and guidance to achieve IG, units which did not realize the need for change initiated processes to address those gaps.[34]

III-D-2. Compatibility

The degree of compatibility can be understood from two aspects: tangible fit between the perceived meaning and values of the intervention and the stakeholders' norms, values, and perceived risks and needs; and how well it fits with current processes and systems.[19] This construct assesses the perception of employee on whether they think IG practices can help with their processes or fill in the gaps of their needs. For instance, if leadership pushes out a new retention policy believing it will decrease the cost of storage and mitigate risk, employee may perceive this as a threat to their current workflow, which in turn would be resisted. In other words, the 21% responded IG program as "No recognized need",[15] could be explained by the lack of compatibility in their values or perceived needs with what they understand about IG.

III-D-3. Relative Priority

Relative priority refers to the stakeholders' perceived importance of the implementation within the organization.[22] Perceived priority of IG within an organization can indicate strong implementation climate because aligning priorities allows stakeholders to treat it as important work instead of a burden to their existing projects. For example, maximizing analytics and business intelligence has been recognized as the top expected benefits. Thus, it is not surprising to see DG has been rated as the highest priority and DG projects are prevalent among IG initiatives.[15] On an individual or departmental level, realizing the number of projects in progress could prevent change fatigue by balancing resources and priorities.[19] Several studies recommended to assemble a dedicated group to establish IG initiatives, make decisions, track achievements and monitor progress.[25, 35]

III-D-4. Organizational Incentives & Rewards

Incentives and rewards can impact job satisfaction, which affects the employees' degree of engagement and commitment to the implementation. Incentives could be tangible or intangible including goal-sharing awards, promotions, as well as increased stature respect.[24] Financial incentives such as departmental bonuses is commonly used in HIM practices to achieve quality measures. It motivates and reinforces positive behaviors to reach objectives. On the other hand, some leaders may choose to add responsibilities to another employee after losing a staff. Extra work falling on others is considered as a disincentive which could hinder staff engagement.[19]

III-D-5. Goals and Feedback

How well goals are clearly communicated, acted upon, and alignment of feedback with goals reflect heavily on the leadership engagement. Setting incremental attainable goals and receiving sufficient feedbacks can positively influence people's behaviors.[19] Specifically, feedbacks to employees need to be helpful, timely and communicated effectively to ensure improvement. This requires a significant amount of leadership engagement. As previously mentioned, lack of executive support is a challenge to IG adoption. One of the effective solutions is to align IG strategies which contribute to achieving business goals. Its importance is partly why AHIMA included strategic alignment as one of the adoption model competencies with its ultimate goal to support an information driven decision-making culture.[25]

III-D-6. Learning Climate

The main goal to create a positive climate which promotes learning is to increase the stakeholders' resistance to failure.[19] Specifically, having time and the supporting environment to reflect on the processes and outcomes of the previous projects can improve future implementations (correlates with reflecting and evaluating construct). Since IG adoption

generally takes an incremental implementation approach due to its complexity, developing a positive learning environment is crucial to its success. Learning climate characteristics are:[22]

a) Leaders expressing fallibility and the need for team input
b) Staff feeling as they are valued and knowledgeable in the change process
c) Team do not feel fearful of failure and willing to take risk for the change
d) Allowing sufficient time and space for reflective thinking and evaluation

III-E. Readiness for Implementation

III-E-1. Leadership Engagement

Leadership engagement measures the commitment, involvement, and accountability of the implementation leaders and managers.[22] Implementation climate is closely related to how well management support is carried out. Strengthening this relationship can foster staff engagement to work together.[19] A study indicated the lack of coordination with IG efforts among individuals and departments as the number one challenge to its progress in healthcare organizations.[5] Having leaders and managers who are not informed and involved will likely to face implementation failure.[19] Another study found 40% of the organizations do not have an IG oversight group such as an IG committee.[8] This finding also implies the other 60% which has leadership oversight may lack appropriate engagement to be effective. Barriers such as difficulty reaching decision consensus, lack of budget, unclear goals or structure should be evaluated in related constructs (i.e. compatibility, available resources, engaging).

III-E-2. Available Resources

Resources may include money, training, education, physical space and time. The level of resources dedicated is positively associated with implementation, though is not an indicator for the degree of success.[19] This implies training and education need to be effective and money spent has to be well invested to increase the level of success. Resource slack often occurs in

organizations adopting a new program. An AHIMA case study revealed that the studied hospital did not have new hires when establishing its IG program as an enabler to its success. The committee and workforce were formed by restructuring roles and job responsibility modifications.[36] On the contrary, another case study recommended over recruitment to offset the challenge of staff retirement, relocation or even lack of interest they faced.[35] Sometimes creative solutions can mitigate risk involved with resources. For example, a health system used HIM students to conduct asset inventory assessment as their practicum project, benefiting both parties.[37]

The lack of awareness and understanding of IG has been ranked as the number one barrier to IG development with 51.6% agreement in the 2017 IG adoption survey.[15] Only well-educated workforce can understand IG concepts and carry out its policies to maintain program momentum. To do that, targeted and ongoing training on the appropriate use of information technologies, gaining information research skills, and developing higher-order thinking skills are essential.[1, 3] Unfortunately, according to an AIIM survey, only 15% reported to have regular IG training.[16] Hovenga believes everyone should have "the ability to find, select, retrieve, decode, critically evaluate and use information to create knowledge and insight."[3] To this extent, organizations should assess staff information literacy to ensure the adequate skills and competencies to handle the complexity of IG implementation and its evolving change. The level of training and education can have a direct impact on culture and implementation climate constructs. This is due to the increase in knowledge changing their perceptions and how they influence others about IG.

III-E-3. Access to Knowledge & Information

Easily and readily accessible resources and how it applies into work routine lead to successful implementation.[19] Knowledge and information about IG can be delivered by people, paper or

electronic based tools and other interventions. Having knowledgeable managers on the team to answer questions timely, providing regular training, and publishing documentation guides are some commonly used strategies in IG implementation. The lack of access to knowledge and information negatively affect program adherence. For example, if an IG policy exists but it cannot be easily obtained, or the employee does not have the knowledge of its existence, such policy is most likely not to be carried out. In this sense, the access to information also needs to be coupled with clear communication about the type of and where the resources can be accessed. The communication aspect is reflected in the networks & communications construct.

In addition, the perceived usefulness and the appropriateness of the target audience cannot be overlooked. Children's Health System of Dallas developed a role-based IG education program using case studies and examples to help employees illustrate how IG relates to them. To assess their understanding, a measurement section was included in the annual performance evaluation. Role-based organizational wide training and assessment has led to the increasing adherence of IG policies.[38]

DOMAIN IV: CHARACTERISTICS OF INDIVIDUALS

IV-A. Knowledge & Beliefs about the Intervention

Employees' attitudes toward IG and their skills needed to carry out IG practices are attributes to assess the quality of implementation and to predict its sustainability from an individual or sub-group level.[19] For example, if employees do not believe IG practices are being implemented effectively in their department, their perspectives can be explored to identify barriers. The attributes in this construct may be relevant to many other constructs: an individual's enthusiasm can be affected easily by peers and their personal experiences,[19] reflecting the importance of cultivating a positive culture to influence subjective opinions; employee skill set and competencies required for successful IG depends on the quality of education and training which

is enforced by leadership engagement; and the believes which IG must be put in place to survive in the digital healthcare increases tension for change.

IV-B. Self-efficacy

Employees' belief in their capabilities to contribute in achieving IG goals depends on their ability to perform the required actions.[19] To this extent, improvement is needed as indicated in the 2015 AHIMA adoption survey: 24% of the respondents were confident their skills to support IG and only 11% considered themselves as credible IG experts.[8] Advancing IG requires a board range of knowledge (i.e. analytics, project management, data quality and control) to coordinate between multi-disciplinary teams as well as managing IG related projects. Understanding employees' confidence in required competencies can help organizations to gauge readiness and target education efforts. One of the strategies used is a self-assessment tool. In addition to identifying strengths and weaknesses of employee IG competencies, it may boost self-confidence if they performed well in the assessment.[27] Additionally, establishing an IG credential program has been reported as a facilitator for the attestation to employees' IG competency, which would in turn increase their self-efficacy and confidence.[8]

IV-C. Individual Stage of Change

This construct explores the characteristics of individuals change from first learning about implementation to becoming skilled, enthusiastic and engaged adapter.[22] For example, as a staff starts to learn about what IG is and its potential, he/she may gain interest and seek opinions from others. When the program is being carried out, more information is needed to practice the change. Finally, as realizing benefits through routine use, the staff would advocate others to adapt.[31] Individuals' perspectives and behaviors change as they gain experiences and information throughout the change processes. Thus, it is a vital measure for implementation progress because

leaders and managers will be able to assess the level of engagement and educational strategies needed to ensure success.[19]

IV-D. Individual Identification with Organization

The willingness to engage and the degree of effort in an implementation depend on the individual's perception of the organization, and the relationship and degree of commitment with that organization.[19] For instance, employees would likely to engage if they believe the organization is doing well. Experiencing work burnout would be a barrier to implementation. These attributes can be measured when evaluating the effectiveness of implementation leaders' efforts, which is throughout the process domain (V) – planning, engaging, executing, reflecting and evaluating.

IV-E. Other Personal Attributes

The impact on implementation process has not been studied on personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style.[19] The understanding of these attributes may take more effort and likely come from a person who has a more intimate working relationship with the individual. Thus, it is possible to provide insights on a micro-level during an implementation. For example, when carrying out a new process, a supervisor may be able to anticipate challenges from the team and strategize targeted solutions to enhance implementation effort.

DOMAIN V: PROCESS

This domain describes four process activities interrelated to other domains as they happen throughout IG implementation phases. They are the components in an active change process required to achieve successful implementation at both individual and organizational level.[19] Thus, these sub-processes should be reevaluated and refined whenever deemed necessary by the decision makers.

V-A. Planning

Implementation plans can be evaluated by how thorough the action plans are developed in advance and the quality of the action plan contents.[22] Implementation failure is inevitable without proper planning and its evaluation. Despite its complexity, planning of the IG program is often overlooked.[25] In fact, 2015 AHIMA survey indicated 72% of the respondents have not developed an action plan for their IG-related goals.[8] IG plans are iterative and should be able to have workarounds and strategies to adapt to change factors.[8, 19] To achieve this, implementation leaders should consider the following areas during planning: stakeholders' needs and perspectives; strategies developed are appropriate to the subgroups; effective form of delivery, imagery and metaphors are used to deliver communication; rigorous monitoring and evaluation methods are used to track progress to meet objectives; and execution is simplified using appropriate strategies.[19]

V-B. Engaging

Engaging is a process of attracting and involving appropriate people in the implementation and use of the intervention through means of promoting, educating, role modeling etc.[22] AHIMA believes the most important enabler to IG success is "having the right people contributing in the right organizational model to lead and develop the program."[25] Damschroder et al. defined implementation leaders as key individuals who make best effort to steer the implementation process.[19] Therefore, they are not necessarily in leadership or management positions. The degree of dedication, the support they receive, how well they can relate to the workforce, as well as the quality of their effort can all impact the implementation.

An IG committee facing difficulty in reaching consensus is not uncommon as it is generally composed of multi-disciplinary experts. A case study illustrated the challenge to balance the involvement between clinicians, technical experts, as well as legal and operations leaders given

the differences in their expertise and beliefs.[35] The study recommended a "collaborative of the willing" approach as others may join when ready.[35] While dedicated influencers make impact, the relationships between them could be more important.[19]

Further, getting endorsement from senior leadership is perceived as a barrier in IG adpotion.[17] This finding contributes to the challenge of getting funding through competing project priorities. To address the lack of executive support, Kersten suggested to first focus on grass-roots projects such as policy development.[39] It is possible for implementation leaders to emerge through the bottom-up process to positively influence implementation because they tend to be empowered and dedicated.[19]

Damschroder et al. further described four specific roles to influence implementation which are described below. Although the types of roles can vary depending on the implementation environment or simply over time, the influence of these roles can be assessed by their presence or absence, how they are brought on board and their role in the implementation.[22] This construct is related to the intervention source construct. Key stakeholders participated in the decision making of IG implementation indicates the level of engagement, which impacts their sense of ownership.[31]

V-B-1. Opinion Leaders

Opinion leaders are categorized into experts (e.g. compliance officer) or peers (e.g. co-worker) within the organization. They are the ones who can influence others' attitudes and beliefs. However, their influence can be negative or positive depending on the nature of their opinions.

V-B-2. Formally Appointed Internal Implementation Leaders

Individuals who used to have an active role in the implementation are in this category. These individuals' opinions are valued due to their previous involvement and knowledge of the

implementation. For example, a formally appointed IG committee member who later became a director of operations. They may become champions or opinion leaders.[19]

V-B-3. Champions

In IG implementation, champions are considered as "local" IG expertise throughout functional units who are dedicated to supporting and advocating IG as well as overcoming resistance to IG adoption.[22, 25] They are usually willing and actively involved regardless of the informal status because they have a strong believe in the outcome of IG.

V-B-4. External Change Agents

External change agents are usually from an outside entity with professionally trained skills to help implement or develop IG initiatives. Some organizations may want to consult with IG services for their IG advancement.[25] It is important to note near-term success is associated with longer active participation from external change agents but with less long-term sustainability. On the other hand, long-term effectiveness will be seen with less consultant involvement while near-term effectiveness may suffer.[19] Thus, balancing sense of ownership need to be carefully considered when external change agents are involved.

V-C. Executing

Executing refers to whether or not the IG initiatives have been carried out or accomplished according to the implementation plan.[19] Therefore, this construct is assessed in the "during" or "post" implementation phase. The quality of the plan execution depends on many factors such as stakeholder engagement, action plan strategies, and the length of the program. The current low IG maturity rate showed effective execution of IG initiatives can be difficult. Damschroder et al. described three methods to mitigate execution risk: dry runs (simulations); pilots (trial runs); and incremental adoption.[19] These strategies help workforce to learn, practice and feel safe and accepted about new changes. As IG framework is complex, long term and can be overwhelming,

it is commonly tackled by breaking down to manageable parts.[32] Incremental implementation while demonstrating early success has been shown to gain staff confidence, increase executive buy-in and maintain program momentum.[28, 32]

V-D. Reflecting & Evaluating

Evaluating the progress and quality of the implementation can be done quantitatively and qualitatively. Reflecting involves with building a structure for regular personal and team debriefing about the progresses and their experiences.[19] Evaluating the process of implementation efforts is vital to program improvement as ongoing personal and group debriefing promotes shared learning and advancements.[19] Healthcare leaders are familiar with both quantitative and qualitative measurements. Various forms of feedback (i.e. Key Performance Indicators (KPI), dashboards, reports, surveys and interviews) can be used to identify areas of success or refinement opportunities. Particularly, the evaluation objectives should be "specific, measurable, attainable, relevant and timely."[19] From another aspect, Neilson[20] suggested identifying implementation factors can also act as a tool to evaluate implementation outcomes. For instance, the results from a pre-implementation assessment could be used to target measures needed to be reassessed. An iterative deductive and inductive approach is likely to be effective in gaining in-depth understanding of the multidimensional relationships between individuals' behavior and their interactions with technologies, processes and changes.[30]

Conclusion

The dynamic IG implementation is an organizational-wide effort which involves the interrelationships between people, process and technology reflective of its culture. It is continuously evaluated and revised to keep up with the pace of evolving technologies and industry demands. However, organizations are struggling to translate their implementation

efforts into expected benefits and IG maturity is still far reaching. This indicates a need to better understand the factors influencing the process of implementation efforts at multiple levels of an organization. To fill this gap, this paper demonstrated CFIR framework can be applied in a systematic manner to identify barriers and enablers affecting IG efforts. To apply this framework in future research or in the real world, the selection of the constructs should be appropriate to the implementation phase (pre, during and post).[21] By synthesizing these variables, organization leaders or researchers can effectively assess readiness, enhance implementation strategies and improve implementation effectiveness. An interview guide is developed to help guide the assessment (appendix A).

It should be noted most IG barriers and enablers cited in this paper are from the field of Health Information Management (HIM). Thus, survey results and experiences are biased towards HIM perspectives. Future work is necessary to understand the impact on IG implementation across healthcare disciplines. Mixed-method studies are crucial to implementation research as it involves multi-dimensional aspects of stakeholders' perspectives and attitudes.[30] Qualitative and quantitative research will be required to test the validity and the evaluation of this framework in health IG implementation.

Appendix A

CFIR Interview Guide for Information Governance in Healthcare

Adapted from CFIR interview guide[31]

DOMAIN I: INTERVENTION CHARACTERRISTICS

I-A. Intervention Source

1. Who developed the IG program strategies? (internal IG committee vs. consultants from outside the organization)
    - What is your opinion of them?

2. Why is IG being implemented in your organization?
    - Who decided to initiate the IG program?
    - How was the decision made?

I-B. Evidence Strength & Quality

1. What kind of information have you gathered about whether the IG program will or will not work in your organization? (e.g. from key stakeholders, co-workers, published articles)

2. What kind of evidence have you gathered about whether the program will or will not work in your department?

3. How does the knowledge affect what you think about the program?

4. What do influential stakeholders (subject experts, leaders) think about IG?

5. What type of supporting evidence is needed to show IG effectiveness for all stakeholders to get on board?

I-C. Relative Advantage

1. Are there existing programs similar to IG program (or a specific IG project) in your unit/organization?
    - If so, how do they compare to each other? Advantages and/or disadvantages?

2. Have you considered any alternatives?
    - If so, how do they compare to each other? Advantages and/or disadvantages?

3. Is there an option which stakeholders rather implement?

Can you describe that option?

    - Why would people prefer the alternative?

I-D. Adaptability

1. What kinds of changes do you think you will need to make to ensure IG practices effectiveness in your unit/organization?

- Do you think you will be able to make these changes? Why or why not?

2. Who decides whether changes are needed?
    - How will you know if the changes are appropriate?

3. Are there processes or technologies should not be altered?
    - If so, could you describe them?

I-E. Trialability

1. What type of approach do you plan to achieve full-scale IG implementation? (i.e. pilots, incremental adoption)
    - Could you describe what your plans are and how it would work?

2. Do you think such approach would be possible to reach IG maturity?
    - Why or why not?

I-F. Complexity

This construct discusses the complexity of IG framework, not the complexity of the implementing IG.

1. How complicated is IG framework? (consider: duration, scope, intricacy, number of steps involved and the degree of how IG would change the current practices)

I-G. Design Quality & Packaging

1. What do you think about the quality of the IG implementation (supporting materials, packaging, and bundling)? Why?

2. What type of resources are available to support you to implement and adherent to IG practices? (i.e. training, guidelines, toolkits, online tools and materials)?
    - How do you access these resources?

3. How will available resources affect implementation in your unit/organization?

I-H. Cost

1. What costs will be incurred to implement IG program (investments, supplies and opportunity costs)?

2. What cost were considered during the implementation decision process?

DOMAIN II: OUTER SETTING

II-A. Patient Needs & Resources

1. How much awareness do employees/leadership have about the needs and preferences of their customers (individuals/groups being served by your organization)?
    - How well are employees communicating with their customers?

2. To what extent were the needs and preferences of the customers considered when deciding to implement IG framework?
    - Could you provide specific examples?
    - Will the IG practices change to adapt to meet their needs?

3. In what ways do you think IG will meet the needs of the customers? (i.e. Improved information security and privacy; Increased collaboration between employees and customers; Reduced care cost)

4. How do you think the customers will respond to IG practices?

5. What barriers will the customers face when adapting to relevant IG practices?

6. What do you know about the customers' thought on IG?
    - Can you describe the specific information or stories you have gathered about their experiences?

II-B. Cosmopolitanism

These questions aim to understand the extent to which the organization encourages employees to proactively bring in ideas from outside.

1. To what extent do you network with people in similar professions/positions outside your organization?
    - What are the venues do you engage in (professional networking, conferences, training)?

2. What kind of information exchange with them, either related to IG or about your profession in general?

3. How does your organization encourage you to network with external professionals?

II-C. Peer Pressure

1. What do you know about other organizations (or other units within your organization) with IG programs in place?
    - How has this information influenced the decision to implement in your organization?

2. Do you know how mature their IG programs are or how successful their efforts are?
    - How does this information affect the support of your organization's implementation efforts?

3. How would IG adoption provide an advantage for your organization compared to other organizations in your area?

II-D. External Policies & Incentives

1. What kind of local, state, or national performance measures, policies, regulations, or guidelines influenced the decision to implement IG?
    - How will IG affect your organization's ability to meet these demands?

2. How will IG affect your organization's ability to receive financial (payment, revenue) or other incentives?

DOMAIN III: INNER SETTING

III-A. Structural Characteristics

This construct can be used to assess relevant social architecture, age, maturity, size, or physical layout of the organization.

1. How will the infrastructure of your organization (social architecture, age, maturity, size, or physical layout) facilitate/hinder IG implementation?

2. How would you make infrastructure changes to address IG implementation needs? (i.e. practice scope, policies or information systems)
    - Can you describe the process needed to make these changes? (i.e. type of approvals needed, stakeholders involved)

III-B. Networks & Communications

1. Can you describe your working relationships with your colleagues (within or outside of your department)?
    - Can you describe a time when you need to work with others to implement a change?

2. To what extent do you get together (formally or informally) with colleagues outside of work?

3. Can you describe your working relationship with your leaders/influential stakeholders? (i.e. executives, champions)?
4. Are there any regular meetings being held and what their agendas looks like?
    - Can you describe who typically attend, how often meetings are held and whether they are helpful?

5. How do you typically find out about new information in your organization? (i.e. new programs, issues, staff departures)?

6. Who are your "go-to" person when you need help and how do they assist?

III-C. Culture

Culture refers to the beliefs, values, assumptions which people embrace. Four types of cultures can be used to guide interviewees' response which normally would be a mixture to some degree:[31]

- Team Culture: Leaders act as mentors, facilitators and team builders. This friendly work environment places value on long-term development and doing things together.

- Hierarchical Culture: Leaders act as monitors, coordinators and organizers. The workplace is structured and formalized which places value on incremental change and doing things right.

- Entrepreneurial Culture: Leaders stimulate new ideas and interventions to create a dynamic workplace which values breakthroughs and doing things first.

- Rational Culture: Leaders influence hard drivers, producers or competitors to create a competitive workplace with its focus on short-term performance and doing things fast.

1. How would you describe the culture of your unit/organization?
    - Do you feel your departmental culture is different from the organizational culture? In what ways?

2. How do you think such culture will affect IG implementation? Examples?

3. How are new ideas embraced to make organizational improvements? Examples?

III-D. Implementation Climate

This question aims to uncover topics to explore more within the sub-constructs as well as other areas which not be included in the assessment.

1. What is the general level of receptivity of IG implementation in your organization? Why?

III-D-1. Tension for Change

1. Do you (or do you think others) see a strong need for IG? Why or why not?

2. How essential is IG to organizational goals and objectives?

3. How do people feel about how data and information is being managed and used currently?

4. How do current practices fail to meet the needs and how will IG fill the gaps?

III-D-2. Compatibility

1. How well does IG fit with your (or the organization) values and norms? (i.e. improving decision making, mitigating cost in e-discovery, improving care coordination)

2. How will new IG policies and guidelines negatively/positively impact your existing workflow and practices?

3. How do you plan to integrate IG practices into current workflows?

III-D-3. Relative Priority

1. In your department/organization, what high-priority initiatives are already in progress?

2. What is the priority of IG implementation relative to these initiatives?
    - Will the IG conflict with or help achieve these priorities?
    - How important do you/other stakeholders think IG implementation is compare to other priorities?

3. What do you think the highest priority is for you/organization?
    - What kind of pressure are you feeling to accomplish this? Why?

4. How will you/your co-workers manage competing project priorities within the job responsibilities?

III-D-4. Organizational Incentives & Rewards

1. Can you describe if there are recognitions or incentives related to IG achievements?
    - Are they targeted to teams or individuals?

2. What would motivate you to promote IG and adherent to its policies and procedures?

3. Do you think your supervisor will consider your role and value in IG during your performance evaluation?

III-D-5. Goals & Feedback

1. Have you/department/organization set goals related to IG implementation?
    - If so, what are they?

2. How do they align with other organizational goals?

3. How are IG goals communicated in the organization? Do they change based on the current need?

4. How are these goals monitored for progress?

5. Do you get any feedback about your work related to IG practices?
    - In what forms, how often and from where?
    - Are they helpful?
    - How can they be improved?
    - Who determines the feedback measures?

III-D-6. Learning Climate

1. Can you describe a recent initiative/program and the motivation to implement it? Consider:
    - key accomplishments or milestones
    - Factors influenced its success/failure
    - Key stakeholders and interviewees' involvement

- Their roles and whether they helped or hindered the implementation
- Whether people were satisfied with the outcome

2. Can you describe a time when you recognized a problem and initiated change or participated in to resolve it?

3. Do you feel you have the time and capacity to think about new ways to improve processes?

4. Do you feel your role to improve processes is valued/respected by your leaders?
   - Are your supervisors and other leaders supportive of your suggestions?
   - What type of actions do they take to increase engagement?

III-E. Readiness for Implementation

III-E-1. Leadership Engagement

1. Do you have an executive sponsor for the IG program?
   - What is this person's role and how has this endorsement affected IG adoption?

2. How has leadership involved in the IG implementation?
   - Who are the involved leaders and whether their attitudes differ?
   - Do they know the purpose and ultimate goals of IG?
   - How have the leaders supported the employees? Examples?

3. What type of support do you expect from leaders to ensure successful implementation?
   - Who are these leaders and whether their attitudes differ?
   - Do they know the purpose and ultimate goals of IG?
   - What kind of support can you expect going forward? Examples?
   - What are the perceived barriers to their support?

III-E-2. Available Resources

1. Do you have sufficient resources to implement and carry out IG practices?
   - If so, can you describe the resources you have available or would like to receive?
   - If not, what type of resources are restricted or not available?

2. How would you acquire necessary resources?
   - Who would be able to help you?
   - What challenges do you expect to encounter?

III-E-3. Access to Knowledge & Information

1. What kind of IG related training is provided for you? (including continuous training)
   - Can you explain whether the training is sufficient for you to carry out the roles and responsibilities expected?
   - What are the strengths and weaknesses of the designed training?

2. What kinds of IG related information and materials are available to you/department? (i.e. online or paper materials, personal contact, internal information sharing)

- Are they timely, relevant and sufficient?

3. Who are your go-to persons when you have IG or its implementation related questions? Are they typically available to address your concerns?

This question refers to leaders and their engagement:

4. What kinds of IG related information and materials have you planned to make available to the workforce? (i.e. online or paper materials, personal contact, internal information sharing)
    - How will you ensure their timeliness, relevancy and sufficiency?

DOMAIN IV: CHARACTERISTICS OF INDIVIDUALS

IV-A. Knowledge & Beliefs about the Intervention

1. What do you know about IG or its implementation?

2. Do you think IG practices will/will not be effective in your department/organization? Why?

3. How do you feel about the IG policies being carried out/plan to be carried out?

4. What are your feelings of anticipation, stress, or enthusiasm?

5. What is the stage of IG implementation in your organization? (i.e. strategizing IG implementation, initiated projects, measuring program effectiveness)
    - What do you think about the progress and why?

IV-B. Self-efficacy

1. How confident are you to:
    - Be able to successfully implement IG practices?
    - Be able to carry out IG policies and procedures?
    - What gives you the level of confidence (or the lack of)?

2. How confident do you think your co-workers are to:
    - Be able to successfully implement IG practices?
    - Be able to carry out IG policies and procedures?
    - What gives them the level of confidence (or the lack of)?

IV-C. Individual Stage of Change

Interviewers can explore interviewees' level of change by using Rogers' or Porchaska's Stages of Change as a guide:[31]

a) Knowledge stage (Precontemplation) - knowledge of key aspects of IG
b) Persuasion stage (Contemplation) – gains positive view about IG and buys into IG implementation; discusses with others

c) Decision stage (Preparation) – plans to seek additional information and test the implementation by piloting or implement a small project
d) Implementation stage (Action) – acquires more information; carries out IG practices regularly and continuously
e) Confirmation stage (Maintenance) – has integrated IG practices into routines; recognizes IG benefits and promotes to others

1. How prepared are you to carry out IG policies?

IV-D. Individual Identification with Organization

There are no specific questions to this construct because responses to other questions are often relevant to this construct. For example, the willingness to engage in IG programs may be expressed from aligning goals in the goals & feedback construct, it may also be relevant here as they are highly committed to the organization.

IV-E. Other Personal Attributes

1. Do you think certain personal traits will affect IG implementation efforts in your department? (tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style)

2. How do you plan on addressing the anticipated challenges?

DOMAIN V: PROCESS

V-A. Planning

1. What type of efforts have you made (or do you plan to) to get an IG implementation plan in place?

2. Describe the plan:
    - How detailed is the plan and is it overly complex?
    - Who knows about it? Is it understandable, realistic and feasible?
    - Who (including you) is involved in the planning process? What are the roles?
    - Are the appropriate stakeholders involved in and actively engaged in the planning process?
    - Does the plan include tracking the implementation progress?
    - Are you prepared to modify or revise your plan due to unexpected barriers?

3. What role has the IG implementation plan played during program execution?
    - Guide IG implementation?
    - Compare anticipated vs. actual progress?
    - Revise or refine the plan?
    - Is updated plan shared with all stakeholders on a regular basis?

V-B. Engaging

These questions address strategies to engage key stakeholders and affected stakeholders.

1. What steps have been taken to encourage workforce to adherent to IG policies?

- Have you identified individuals/groups need to be targeted?
- How do you plan on approaching them? (i.e. communication plans, type of information given to them)

2. How do you plan to spread the words about IG in terms of communication or education strategy? *(This question does not include training as it is assessed under the access to knowledge and information construct)*
    - Through what materials/modes/venues? (e.g. emails, department newsletters, e-bulletin boards, brochures)
    - Through what communication process? (e.g. staff meetings, talking to people formally or informally)

3. How will you/co-workers communicate to stakeholders (i.e. analysts, business decision makers, clinicians, patients) who are affected by IG?
    - In what way do they participate in IG initiatives?
    - How do they benefit from the IG advancements?

V-B-1. Opinion Leaders

1. Who are the key stakeholders to get on board to help IG adoption?

2. Can you identify influential individuals (experts or peers) in your work setting?
    - What are they saying about IG?
    - How do they influence others' beliefs about IG practices and the IG success as a whole?

V-B-2. Formally Appointed Internal Implementation Leaders

1. How did your organization become involved in advancing IG?
    - How was the decision made?
    - Who participated in the decision-making process?

2. Who will lead IG implementation? *(questions can be expanded to others who are involved in leading the change)*
    - How was/will be this person brought on board- Appointed? Volunteered? Voluntold?
    - What attributes or qualities this person does/does not have to lead an effective implementation?
    - Does this person have sufficient authority to take necessary actions to implement IG in an organizational wide scale?

V-B-3. Champions

1. Other than the formal implementation leaders, can you identify champions who will go above and beyond to influence IG implementation?
    - Is this an informal status (role) or appointed position?
    - What are their positions?
    - How do you think their behaviors and actions will help with IG implementation? (i.e. gaining stakeholder buy-in, helping to solve issues)

2. What is your/others perception about these champions?
    - Do you respect the opinions and actions of the champions?

V-B-4. External Change Agents

1. Will experts from outside your organization be helping you with implementing IG? (i.e. IG consultants, experienced leaders from corporate office)

2. If so, can you describe:
    - How they got involved?
    - What their role is?
    - The type of activities they will be engaged in?
    - Your thoughts on how helpful they will be?

V-C. Executing

1. Has IG initiatives been executed according to the implementation plan?
    - If so, can you describe it?
    - Otherwise, why not? *(This response may be related to other constructs to explain the reasons for plan failure such as lack of awareness)*

V-D. Reflecting & Evaluating

1. What type of information are you collecting as you implement IG initiatives?
    - What specific measures are you tracking?
    - How are you tracking them?
2. To what extent do you receive feedback about IG efforts?
    - What is the content, mode, form and frequency of the feedbacks and who determines them?
    - How helpful do you think they are?
    - How could they be improved?
    - Where do the feedback come from (i.e. scorecards, staff/affected stakeholder interviews)?

3. How do you assess the progress towards IG goals?

4. How do you share the evaluation results to all stakeholders?

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