

Health Informatics

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Information Technology Essentials for Behavioral Health Clinicians

 Springer

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Everything that can be counted does not necessarily count; everything that counts cannot necessarily be counted.

Albert Einstein

The only man who behaves sensibly is my tailor; he takes my measurements anew every time he sees me, while all the rest go on with their old measurements and expect me to fit them

George Bernard Shaw

As anyone who has implemented an informatics system can attest to, one of the most challenging issues when evaluating such a system is developing methods to isolate the effects of information technology (IT) within the dynamic environment of behavioral healthcare. There are many books and articles written about evaluation principles and methods, and this chapter does not seek to supplant them; instead, an overview of evaluation and its role in behavioral healthcare informatics system implementation will be presented. Behavioral health has traditionally spent less on IT as a percent of revenues than the medical and surgical fields, but as shifts in public policy begin to force the hand of change, evaluation of the return on investment of informatics must be undertaken if behavioral healthcare is to maximize its potential.

Many staff in behavioral healthcare organizations struggle with understanding the impact of IT on their organizations. Often people within the team begin pointing to the lack of tangible results even before implementation projects are complete. Some people begin to question the implementation, and they express their anxiety by saying “This isn’t going to work.” Others are perhaps uncertain, worried about change and their ability to adapt. Many times, organizations act to optimize or indeed focus on short-term performance measures for new technology, but the process of implementing changes may take months by itself and then even longer to realize significant results.

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The high-stake and high-cost¹ decisions linked to information technology implementation pressure the implementers to demonstrate that the new information technology makes a difference in their practices. Many behavioral practitioners fear that new technology efforts must produce measurable results in a relatively short time. The message about the expected effectiveness of technology, including timelines and outcome expectations, needs to be conveyed to the entire staff at the beginning of and during the first 12 months (or more) of the implementation. This is crucial as research has found that perceptions of using electronic health records is usually low during the beginning of an implementation, but greatly increases over the first year of usage.² In addition, as time using new IT increases, adherence to evidence-based guidelines for treatment increases as well.³

Today, more than ever before, evaluation and outcomes research is critical, as proper use of information technology can lead to more satisfied organizations, healthcare providers, and patients. In the rest of this chapter, the reader is guided through important issues in behavioral healthcare informatics evaluation, from the benefits and challenges to key issues and common evaluation methods. First, however, an operational definition of evaluation and what it does must be addressed.

What Does Evaluation Really Mean?

Usually, the initiating question for an evaluation is “Are the information technology systems implemented in behavioral healthcare achieving their goals?” Although this seems like a logical question to ask after putting an IT system into place, not everyone either wants to take the time or is interested in the answers. People may say “the current system is working fine, and the technology is not available to do what I want anyway” or “we cannot ask the clinicians because we do not have the money for a new system anyway” or “leave well enough alone.” Thus, those responsible for information systems sometimes do not see the need to evaluate, since they have either limited desire or perceived lack of ability to change things. However, there comes a point for most information system leaders when it is important to ask these questions:

- How are we doing in general?
- Are we accomplishing what we set out to do?
- Are we meeting our end users’ needs?
- Are we keeping current technically?

These questions may be precipitated by a crisis, for example, a shortage of funds, competing needs, obvious failures, and so on. Alternatively, senior administrators may want to know if they are getting their money’s worth from this system. In the case of a new information technology system, there is often a concern with learning whether the new system represents a good approach or if there are any changes needed. Regardless of the impetus, evaluation is the way to answer those questions.

At its core, evaluation and evaluation research are concerned with determining out how well something works or how well a particular goal has been accomplished. That

“something” could be an information system, a department within a hospital, or a particular service; goals could be a certain level of improvement in symptoms, usage of a system by practitioners, or time spent on a certain task. Evaluation represents the application of social science research methods to discover important information about the program, practice, or department. This information can then be translated into certain actions designed to improve or ameliorate problems or simply improve existing services.

Realistically, evaluation is undertaken by an individual or organization to respond to specific areas of concern. These areas could be analysis of an existing situation and development of a projected ideal, justification of a current or proposed activity, or analysis of the quality of an activity or operation. One classic definition of evaluation is “the process of ascertaining the decision areas of concern, selecting appropriate information, and collecting and analyzing information in order to report summary data useful to decision makers in selecting among alternatives.”⁴ This definition of evaluation is based on the following assumptions:

1. Evaluation is an information-gathering process.
2. The information collected will be used mainly to make decisions about alternative courses of action. Therefore, the collection and analysis procedures must be appropriate to the needs of the decision-makers.
3. Evaluation information should be carefully presented to the decision-makers in a useful form with great care taken to avoid confusing or misleading them.
4. Different kinds of decisions will often require different kinds of evaluation procedures.⁴

Since healthcare organizations are in the business of trying to improve the human condition through a variety of organizational efforts, they are always making changes in services, departments, information systems, and so forth. An evaluation of those efforts is important to prove the value of the program or service. An evaluation of a behavioral health informatics system is needed not only to prove its value, but also to determine if the system is doing what it was intended to do.

Common Evaluation Methods

When there is interest in determining how well the information system is working, the evaluation can proceed by several routes. The processes are often foreign to those schooled primarily in the physical sciences and are more familiar and comfortable working with variables that are more precisely measurable and in purely physical terms. One way is through an impressionistic, qualitative inquiry: an individual, a team, or a committee asks questions. Proceeding much as a good journalist does, the investigators talk to the program director, staff members, and recipients of service (i.e., patients). They sit in on sessions, attend meetings, look at reports, and usually in a few weeks or months come up with a report. Much useful information can be ferreted out in this way, but the procedure has obvious limitations. First, it relies heavily on what people are willing to reveal about the

situation, often including self-disclosure. There is a noticeable difference if the investigators are from within versus outside the department, as external evaluators may be seen as more objective, but there may be greater reluctance to discuss problems. The journalistic inquiry also depends on the skill, insight, and objectivity of the investigators. If they are rushed, bland, or biased, their assessments may not be useful or accurate. Perhaps, the most significant drawback is to exclusively focus on what is happening at the present. Whatever the merit of its findings, the investigation usually tells little about outcomes, including what effect the system under evaluation has in helping participants achieve the goals that were originally agreed upon.

Another assessment technique is to administer specific questionnaires or structured interviews that ask people's opinions about the program. Superficially, this appears more scientific and objective than the first type of investigation, and it does prevent the more patent intrusion of observers' biases. On the plus side, it also yields clues about program strengths and weaknesses. But again, as a method of evaluation, it is limited by what people divulge and by their immediate time perspective. If longitudinal data collection of this type is undertaken, however, much more important information can be obtained. This can include changes in usage patterns and attitudes over time, allowing comparisons between skills at the beginning of an implementation and the present.

Finally, examining the data within the IT system itself can be an excellent evaluation method. This has the advantages of being free of potential rater/reporter bias and usually much quicker. As an example, the evaluator could see what percentage of paper-and-pencil medical records were completed correctly before an IT implementation and compare that to what percentage were completed correctly after a new system that uses electronic medical records. Or adherence to evidence-based guidelines for medication administration or therapeutic administration could be compared. Alternatively, time spent on completing paperwork before and after an implementation could be tracked across time or almost any metric of patient care or practice that is included within the system.

Regardless of the method of evaluation chosen, it is important to have a proper team in place to perform the evaluation. Persons unfamiliar with interviewing or qualitative data analysis, for example, should not be placed in charge of such an evaluation, and people not skilled in psychometrics and statistical analyses would likely fall short when placed in charge of that type of evaluation. Matching your team to your task, in this as in so many other areas, is key.

Benefits of Evaluation

The true impetus for change in most sectors of healthcare is that the new will outperform the old in some way. When examining use of information technology and informatics in behavioral healthcare, studies have revealed numerous benefits, from providing access to otherwise unobtainable information⁵ to more complete, easier to retrieve records⁶ to better adherence to evidence-based treatment guidelines.⁷ In addition, more "mundane" concerns, such as legibility of handwriting, misfiling of information, and time spent searching

through poorly organized charts can be easily addressed via electronic medical records.⁸ But evaluation of these systems also provides benefits above and beyond these, for organizations, practitioners, and patients.

Organizations stand to benefit hugely from conducting proper evaluations of IT systems in use in their environments, such as electronic medical records (EMR). Given the high rate of adverse healthcare events due to medical errors, and the subsequent legal difficulties associated with those events, it is imperative for organizations to minimize such errors. Paper and handwritten records are notorious for errors of various kinds, including omitting important information (for example, signatures or dosages), inputting wrong information (for example, misspelling or writing wrong abbreviation), and being illegible by other providers.⁹ EMRs can "force" providers to input proper, complete information by not allowing the records to be submitted unless certain criteria are met (that is, all areas of the record filled out). Indeed, such systems have shown 40% increases in completeness and reduced time to retrieve information by 20%, boosting productivity and reducing the chances that important information will be missing.^{6,7}

By conducting evaluations of IT usage, organizations can see who is (and is not) benefitting from use of systems like EMRs then target those providers with additional training and resources on the use of technology, allowing the organization to fully reap the advantages of such systems. This targeted training will also prevent those who *are* using IT properly having to waste valuable time on unneeded training, cutting into the ability to productively care for patients. In addition, properly evaluating the informatics system in a particular organization can lead to a better understanding of what services are being most frequently and infrequently used, allowing for more informed decision making regarding what services to continue and discontinue, upgrade or remove.

Practitioners, as the hands-on users of the majority of IT, also have a large number of potential benefits from effective evaluation methods. First, evaluation of IT usage can help practitioners to make sure that they are utilizing an informatics system to its full potential, across areas such as record keeping, information access, and ease of communication with other professionals.¹⁰ For example, using EMRs would result in less time being spent in answering questions about what exactly a word is in a note, or double-checking that medications and dosages are correctly read by nurses or pharmacists.⁹ Such time savings can result in either less hours worked or more patients seen in the same amount of hours, both desirable outcomes for professionals. For example, the Danish healthcare system, which is often cited as the most efficient in the world, saves physicians an average of 50 min per day in paperwork.¹¹ For those individuals working outside of hospitals or organizations, such as private practitioners, making sure that one is keeping complete, easily accessible records can result in less time spent having to dig through older files for information to send to another practitioner for consultation or continuity of care.

Patients are the most removed from the evaluation process, in that they do not directly use the IT systems, but can, in many ways, benefit the most from effective implementation and evaluation of informatics systems. The core of any information system is the data inputted into it, and in the case of behavioral healthcare, all those data come from clients, either directly (for example, a developmental or medical history) or indirectly (for example, results of blood work or testing). Given that research shows traditional, paper and

pencil methods of record-keeping to be inferior to electronic systems on a number of factors, it only follows that using EMRs and the like will result in an accurate, thorough record of a client's health and history. This history will not only be more complete, but also more easily transportable, able to be transferred between hospitals and practitioners quickly and easily, with no degrading of content (as it often occurs with copies or faxes, as one example). In addition, research shows that practitioners are more likely to adhere to evidence-based treatment guidelines when using certain types of IT⁸, which results in a higher likelihood of positive outcomes for the patient. Evaluation can help to ensure that organizations and individual practitioners are using IT appropriately and effectively, or can help them to reach new goals; either way, patients will benefit.

Critical Evaluation Issues

Mindset of the Evaluator(s)

While the methods and goals of evaluation are crucial, equally important is the individual or group performing the evaluation and the way they approach this often daunting task. Prior to the implementation of the selected evaluation method, several things must be attended to. First, having agreed-upon goals and methods to measure those goals must be accomplished. Imagine going on a road trip with no map, no car, and no place you want to end up. Not only will you not likely go very far, but you would also not know if and when you got to where you were going. Ensuring a clear, doable plan for evaluation allows the rest of the process to proceed effectively and gives you specific tasks to accomplish and a timeframe within which to accomplish them.

Once your plan for evaluation is put into action, the evaluators must carefully follow the agreed-upon plan. If any deviation from the plan is required, an understanding of how this will impact the evaluation as a whole must be considered. For example, if an organization had decided to use a particular outcome measure (for example, number of return visits for medication management, adherence to a specific treatment plan, percentage of records completed correctly) and then in the midst of their evaluation were unable to access that information for certain practitioners/patients, how would that be handled? Would different information need to be collected? Would those be skipped and not counted? How this situation would be handled would need to be communicated to the entire evaluation team, with appropriate changes integrated into the evaluation plan and, if necessary, approved by the appropriate parties.

After the evaluation process is complete, the evaluators should not simply congratulate themselves (although that should happen as well), but should also engage in a reflection and evaluation of the evaluation process itself (see "Evaluating the implementation" below): Difficulties encountered, how such challenges and problems were met and solved, what worked well and what would be changed next time; all of these can provide much needed guidance for the next round of evaluation. Such a recursive model can lead to evaluation becoming even more efficient and effective each time the process is undergone.

Stakeholders

The stakeholders, those who support and/or use the system, need to be included in the evaluation process. This includes identifying appropriate, measurable indicators and developing reliable methods that will yield insightful and valid information about what makes information technology effective in behavioral healthcare. Stakeholders need information on how using information technology changes patient care and what will be the organizational impact of the information technology system, and they need to know the outcomes that can be expected at different stages of the technology's implementation. The evaluation findings must be documented to satisfy diverse stakeholders' needs. Interest in technology's use in healthcare is at an all time high, as is interest in the effectiveness of that technology. Patients and their families want to know if their loved ones are improving and what their future outcomes will be. Practitioners want to know how and if the system is improving their ability to administer effective care. Administrators want to know if throughput is increasing with technology and if outcomes are improving. Funders, policymakers, and taxpayers want to know if information technology is sufficiently promising to continue investing in behavioral healthcare. Documenting and reporting evaluation data to meet these diverse stakeholders' need-to-know presents evaluators with many challenges.

The gap in the data needs of policymakers or administrators and practitioners is particularly heightened. While policymakers and administrators want to see data on the effects of technology (usually on the bottom line), practitioners need information that can be tied to changes in systemic practices to improve outcomes. Policymakers/administrators tend to value reports documenting financial improvements, while practitioners need reports documenting implementation outcomes in order to make sound decisions about their patient care plans. Both kinds of data are important, but each fails to satisfy the needs of the other. The best hope of closing this gap lies in helping all stakeholders to see (1) how information technology can be an effective complement to and component of the existing behavioral medicine system, (2) what technology can and cannot accomplish, and (3) how effective evaluation of new or preexisting technology requires multiple measures in order to determine its impact on multiple levels of stakeholders.

Behavioral Healthcare Practitioner

The role of the behavioral healthcare practitioner is crucial in evaluating the effectiveness of information technology. They must see evaluation as a reflective process to help improve their practice. Technology has the potential to revolutionize what behavioral healthcare practitioners do by several means, including interaction with some patients through technology or delivery of more effective treatments. Information has added new breadth and depth to patient care by increasing the level of quality management. This, in turn, has the potential to transform the role of behavioral healthcare practitioners. Today's practitioners need to know how to manage interactive group dynamics as well as information technological systems.

Implementing an innovation in behavioral healthcare practice can result in practice running before policy. Some existing policies may need to be "transformed" to match

the new needs of practices using technology. One evaluation goal is to understand the conditions of technology use and to use that understanding for improving patient outcomes.

What does Evaluation Entail?

The Link to Expectations

Information systems generally aim to provide people access to information that they need as accurately and rapidly as possible. Evaluation is the process needed to determine if the goals and expectations of the system were actually achieved. When beginning an informatics evaluation process, it is important (1) to have a baseline assessment of the current system and (2) to link the evaluation to the comparison of outcomes to expectations. Before any organization decides to implement a new health information system, there are usually specific organizational expectations and goals for the new system. An evaluation will help organizations determine if the new behavioral health informatics system matches those initial system's expectations.

An evaluation process usually has three components: (1) an information gathering section, (2) an assessment of the information gathered, and (3) a decision or future action component. To better enable the organization to make future decisions, the evaluation process should be started at the very beginning of the development or acquisition process for a new health information system.

Baseline Analysis

To understand the real impact of any new system, it is important to measure where the organization is before the development or acquisition process begins. Thus, measuring the state of the systems and the information flows before any action is taken is highly beneficial. However, while the need for baseline information is important, practical reasons may prevent the baseline data from being collected. For example, the top managers may feel that immediate action is needed and that they cannot wait for a systematic evaluation prior to implementing a system. Another reason might be that the organization does not have the resources – money or people – to complete an evaluation of the current system.

One of the major benefits of a baseline evaluation is that it can help the organizational change and senior leaders to thoroughly understand the current system. They can then determine if the “change” direction they are considering will meet the needs of the organization and its people. Another benefit is that the baseline information may be helpful after implementation to prevent spurious comparisons of the new system to the old one. This can come in handy if people start reminiscing about the “good old days” and how wonderful things were before this terrible new system was installed.

When evaluation is not considered until the installation of the new system is completed, the opportunity for an accurate baseline evaluation is lost. Those charged with postsystem evaluation must rely on retrospective reports, with all the risks of memory distortions, or on whatever documentary evidence happened to exist for other reasons at the time the decision to implement the new system was made. Unfortunately, such evidence is usually inadequate for a proper comparison. Sometimes baseline measurements are incomplete simply because of lack of experience and foresight about what data might be needed later.

System Expectations and Goals

Before an organization makes a commitment to changing an information system or to installing a system where one does exist, there are usually many hours of discussion and a clarification about the goals and expectations for the system. Organizational vision and needs are discussed, probable system costs are examined, and many organizational levels and people are consulted before final approval occurs.

In order to complete an effective evaluation of the new information system and the implementation process, it is essential that these realistic system expectations be clarified and used in the evaluation process as a measure of success or failure. The system expectations should be known to all involved in the system design and selection process. The expectations need to be written in simple declarative “capable of” statements, which are in turn used to develop evaluation questions and the evaluation methodology.

In evaluating behavioral health informatics implementations, there are three critical questions. Keeping these concepts separate is critical in evaluation since, if they are confounded in the evaluation process, the interpretation of any outcomes is of questionable value. These questions are:

1. What is the target for the organization on this particular measure of evaluation?
2. How close did the organization come to the selected target?
3. How many resources did it take to reach the level the organization is currently at, and what resources will it take to hit what was defined as the target or goal?

Regarding the first question, there may not be only one target to evaluate. Indeed, this is rarely the case. Instead, multiple targets (patient retention and satisfaction, number of medical errors, time spent on record keeping, etc.) are often evaluated at the same time. In this case, it is important to have goals for each target carefully operationalized and clarified for all evaluators so that a determination can be made of how close (or far away) the organization is from each target (question two). Finally, understanding what “got us here” (the resources used to reach the current level of performance) and what is needed to “get us there” (the organization's actual goal) allows for an examination of resource allotment and how/if it should be changed to improve outcomes.

Evaluating the Implementation

The system implementation process is very important. Was the process smooth and without stress? Did the physicians, nurses, or other practitioners actively participate and feel involved in the process? Did events happen as planned? What were the strengths and weaknesses of the manner in which the implementation occurred? These process-type issues are included in evaluating the actual implementation of a new behavioral health informatics system.

An actual and first-hand account of what is being done is needed to evaluate the actions and events that occurred in the implementation process, especially if the system being implemented is for the total, complex health organization. Very often, the strategies listed originally differ from what happens in the “heat of battle.” As such, the person charged with the evaluation cannot assume that the plans and the actual implementation went as stated unless there have been quality control checks throughout the evaluation process. There are a number of reasons for the possible discrepancy, including unclear perceptions or wishful thinking on the part of the staff and unrecognized conflict between people or groups. Evaluation is another reason why a dynamic planning and control process is so important. In addition to the direct planning benefits, such a process also provides a historic project trail for evaluation purposes.

One of the most difficult tasks in completing an evaluation study is finding the best techniques for understanding a process and the effects it has on people and systems and for estimating the degree to which observed phenomena approach the objectives of the program. This process is made easier by clear definitions of the goals and objectives. A practical problem of measurement in many studies is that of obtaining usable information. The application of evaluation techniques to the topic of an implementation process is usually costly and time-consuming, but important in order to redirect future efforts.

Make assessment and developing new abilities for appraising change a top priority among advocates of change. Learning to assess the consequences of significant change initiatives is a complex new territory, often neglected by leaders of those initiatives. In fact, assessment represents an opportunity for those advocating and championing change, particularly for line leaders. If they assume greater responsibility for assessment and measurement of their progress, they can make it a key strategy for accelerating learning. The key shift is to bring measurement and assessment into the service of learners, rather than have it feared as a tool for outside “evaluators.”

Evaluating the Quality of the System

After years of work, the health informatics system is implemented. Does the system do what it was originally designed to do? Is the system providing the type of information needed? What are the strengths and weaknesses of the system itself? These types of information must be gathered in the evaluation of the system, with a particular focus on how well it performs and meets expectations.

The same techniques and issues apply to the evaluation of the actual behavioral health informatics system as it applies to the evaluation of the implementation process. The

collecting, analysis, and presentation of data and information about the effectiveness of the new information technology-based system is important to determine if modifications are needed – in the system or in the redesign of the current process/information flow.

Time Delays

One should appreciate the time delays that are involved in large-scale change. The ultimate success or failure of IT implementation efforts based only on early results will not accurately reflect whether the system did or did not meet goals. Developing new capabilities is a matter of discipline and of regular practice with particular tools and methods, over a course of years. Those responsible for the information technology implementation can promote a realistic time period for others to realize and appreciate the resulting benefits. Referring to literature which shows gradual improvements over time for usage of new IT systems² may help to assuage the desires of administration and others for instant results.

What Do We Do with the Information?

The underlying belief in evaluation efforts is that the study of the data, information, and communication collected furnishes the basis for constant feedback and readjustment of activities within the complex organization. In earlier days, the concept was often referred to as “learning loops” or “feedback loops,” but today the emphasis is on building what are known as “learning organizations.”¹² The purpose of evaluation, therefore, is to provide information that, if acted on, can help transform the organization to become more effective, efficient, and successful.

The evaluation of complex organizations requires the formulation of objectives and criteria of accomplishment on a much broader scale. It is generally agreed that successful evaluation studies cannot be performed retrospectively, but rather must be built into the programs at their inception for true learning to take place. This is one reason why obtaining baseline information (see above) is so important to a useful evaluation. A number of considerations, therefore, must be taken into account.

- When present from the beginning, the evaluation is less threatening, both because it seems part of the total process and because people come to feel they have had a hand in planning the evaluation.
- When skilled evaluators are an integral part of the planning phase of the system implementation, they can often help to improve the quality of the objectives as their attention is focused on the measurability of achievements.
- Experienced evaluators may be able to contribute substantively to the planning process by drawing on both their experiences and their knowledge of established social science findings. They may be able to suggest methods of known effectiveness and point out known difficulties in both the current operations and the system under development.
- Evaluators who are present from the start can follow the entire system and implementation process through planning, pretesting, and full-scale operations, thereby gathering information and keeping records of actual happenings.

Some organizations have established process action evaluation teams that may be made up of nurses, ward clerks, or other unit staff. The role of this team is to observe the day-to-day operations of the implementation process and to maintain a diary on the use and behavior of the system after it has been fully implemented. There are many ways for organizations to gather data. However, the key is using the data that has been gathered to make positive, proactive changes in the way systems are implemented within the organization and in the way that systems are designed and selected in the future.

Once the information from the evaluation is gathered and analyzed, it must be interpreted and summarized. The results of the evaluation are sometimes best communicated in small doses, allowing changes to be introduced gradually rather than abruptly. This approach reduces the resistance to any changes. If the people who did the evaluation remain as closely connected to the effort as possible and help the change leader and senior leaders interpret and implement the findings, the results of the evaluation are more likely to be adopted than if a report is dropped in the lap of the change manager with no provision made for explaining findings or helping implement action steps.

Conclusion

To evaluate means to assess value. Before the assessment can take place, the desired value must be understood. Evaluation criteria may include the following: “(1) To monitor a steady state so as to determine when a correction is necessary. (2) To identify alternatives in a problem (nonsteady) situation and provide relevant information. (3) To weigh alternative courses of decision-making in terms of relative gains and losses and (4) To determine corrective action and the error-risks involved in various approaches to change.”¹³ But in order to be useful and fulfill these criteria, the evaluation must be properly planned and implemented. While evaluation can provide numerous benefits, poor evaluation can instead provide numerous headaches. Keeping the principles described in this chapter in mind will allow the organization or individual to gain useful information that can assist in enacting meaningful change.

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