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Does failure breed success: narrative analysis of stories about computerized provider order entry

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Summary *Objective:* To assess the definitions of success and failure as defined by the participants of the Menucha Consensus Conference on Computerized Provider Order Entry (CPOE). *Design:* Thirteen experts from various fields participated in Menucha Consensus Conference. Though they belonged to different fields, all of them had some kind of experience in CPOE implementation. *Measurements:* The stories of these experts were analyzed using a constant comparison method and partially ordered display. *Results:* Each participant told a success and a failure story. Definitions of success and failure, as well as variables contributing to the success and failure of CPOE implementations, were extracted from the transcripts. *Conclusion:* Analysis reveals that what is considered a failure is context dependent and that it often is an antecedent to success.

1. Introduction

Previous work by the provider order entry team (POET) [1—7] revealed several principles related to successful implementation of Computerized Provider Order Entry (CPOE). The Menucha stories were collected as part of a consensus conference to develop a set of guidelines for implementing computerized provider order entry (CPOE) [8]. Carefully structured activities such as brainstorming sessions, small group breakouts, and narrative recounting were selected to elicit thoughts for the creation of considerations reported elsewhere. This paper reports upon one of the activities, narrative recounting, in depth.

2. Background

In qualitative research, narratives are oral accounts of events with plots and storylines [9], particularly of ''epiphanies of lived interpersonal experience'' ([10] p. 35). Narratives recount events and activities as interpreted and filtered through the storyteller. Narratives are presented in natural language and are thought to recount events and actions, which made a strong impression upon the teller.

''Narrativization tells not only about past actions but how individuals understand those actions'' ([11] p. 19). In this instance, the narratives were topic-centered, dealing with stories of successes and failures in the implementation of CPOE. Variables of interest included the definition of success, the definition of failure, factors that led to success, and factors that led to failure. Some researchers note that often a storyteller is 'telling a tellable story' ([11] p. 20). In other words, we

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recount stories, which tend to follow a standard beginning-middle-end format. The stage is set, something happens, there is a punchline, moral, and pithy end. The Menucha participants followed this structure and this facilitated subsequent analysis of success and failure factors.

3. Methods

3.1. Participants

Thirteen experts, representing clinical leaders, social scientists, information technology implementers and vendors, were purposively selected by the primary investigator of the study (Ash) to participate in the 2 day consensus conference. In addition, seven members of the team of OHSU researchers (referred to as POET) helped to facilitate the small and large group discussions but did not act as expert stakeholders.

The facilitator (Stavri) had relatively little knowledge of either the participants or CPOE. She was selected to facilitate because of her expertise in both facilitating and qualitative methods, and her objectivity about the topic.

3.2. Narrative analysis

Riessman defines a personal narrative as ''talk organized around consequential events. A teller in a conversation takes a listener into a past time or 'world' and recapitulates what happened then to make a point, often a moral one ... [n]arrative studies (are related) to ethnographic accounts and recent approaches to textual analysis'' ([11] p. 4). Narratologists are interested in how people interpret things and how this is reflected in their recounting of events. It is not taken as a given that the story is a realistic description of truth. In this instance, the teller's story will be influenced through participation in a group of others with common interest and experience in CPOE. In the narrative tradition, it is understood that there is an inevitable gap between the living of an event and the eventual retelling of it (paraphrasing Riessman). In the case of the consensus panel, there was a shared experience developed among the participants of the consensus conference. Vocabulary, historical context, preexisting and burgeoning relationships manifested themselves in the telling of stories. In addition, listeners may have had foreknowledge of the event being retold, perhaps even as partners in the event or they may have heard the story in the past. Stories might ''take a different form if someone else were the listener'' ([11] p. 11). In other words, the telling of a story is influenced by the tellers' knowledge of the listeners as well as the listeners' knowledge of the storyteller. All this is taken into account during the analysis.

Since the task involved the telling of stories, the most commonly used technique of content analysis whereby researchers glean meaning from the phrases in isolated context, is of limited utility in analysis of narratives given each story's context dependency. We wanted to understand the narrative, i.e. success or failure story as a whole. Each story was a part of the whole consensus conference in a macro sense as well as one of two companion stories told by each narrator. Each story was amplified by the questions asked by other participants and each story that had preceded it. Narrators developed relationships with other participants and many came with even longer standing relationships with one another. The sequential and structural features of the story are as important as the words in narrative analysis. In this case, success and failure stories are so intricately related, a finer grained conceptual analysis would have been inappropriate.

3.3. Setting

The storytelling activity was part of a larger consensus conference held in Oregon at a retreat center called Menucha overlooking the Columbia River Gorge [8]. The name Menucha metonymically came to mean the results of the consensus panel as well as the place to the participants. Large and small group discussions took place in comfortable rooms with moveable furniture. Participants spent the night at the retreat center, which added the opportunity to continue discussion informally until late into the night.

3.4. Data collection

This activity took place after lunch of the first day of the consensus conference. By the story telling task, the participants had developed rapport from both large and small group interaction. Certain expressions that had been used throughout the day, such as 'help at the elbow' and 'pizza budget,' became ''shorthand in subsequent discussions as the group continued to develop shared language.

During the first round of story telling, participants were instructed to provide the group with ''the highlights of a success story'' which could be a successful implementation or piece of an implementation, each talking for approximately 5 min. They were asked to provide information about what happened: ''What do you think led to the success?

What do you mean by success?'' During the second round of storytelling, participants were asked to tell a failure story, or ''pitfall, a stumbling block, a burp.'' Again, they were asked to recount: ''What happened? What do you think led to that stumble or that fall? And why do you say that it didn't work? Why do you say that it failed?''

The facilitator had requested the presentation of stories in advance, before having met any of the participants. The storytelling was constrained by time to meet the goals of the conference that included multiple activities. If the story was completed with time remaining, other participants were free to ask questions or suggest considerations for the 'bank' (the bank was a list of important diversions that merited further discussion, arising throughout the day). Forms were provided for participants to take notes on each other's stories to help participants make sense of each other's stories and most likely contributed to the consistently structured stories.

These stories are topic-centered narratives or snapshots of past events that are linked thematically ([11] p. 8). The link that bound the tellers and a central tenet of this research was a perspective of the same event, namely, implementation of CPOE. With our carefully selected participants representing multiple stakeholders in the process, tellers had different roles in an implementation (vendor, IT, nurse, etc.) but the commonality they held or were bound by was an experience of some kind in a CPOE implementation.

3.5. Data analysis

All tapes from the Menucha conference were transcribed verbatim. While the storytelling transcripts were reviewed separately from the other consensus data, the stories were informed by exercises preceding them during the day as well as informing the subsequent development of themes and sub-themes reported elsewhere, which were turned into considerations for the implementation of CPOE [8]. The success and failure stories yielded approximately 2100 lines of text for analysis. Stories were reviewed using the constant comparison method, and data reduced into a partially ordered display reflecting time (flow and sequence of events), role (story teller according to position-related experience) and concept (variables and interactions) ([12] p. 141). This paper focuses on the definition of success and failure as defined by the participants (Table 1), and the factors that lead to a successful or failed implementation derived from the narrative (Table 2). In line with other qualitative methods, interpretation was filtered through the researchers' knowledge regarding how the stories were constructed.

Examples of success and failure stories are provided below (conventions used in the transcription of qualitative data include brackets to indicate that the word has been added, and ellipses to indicate a pause).

3.5.1. Success story

Y: My story is the story of implementing electronic signature across four hospitals and 1500 doctors in 9 months. And what led to the success was that I started to politic for this system about 2 years in advance meeting with medical executive committees and physician groups showing the system, both good and bad aspects and saying a rough spot is going to be this. This is the reason we *have* to do it. Here are the points you're going to get from it and here are the weak spots and preparing them and coming back a year later and saying, ''We're still doing it; the software's improved a little bit but we still have these weak spots.'' And another thing that led to success was that we had, I think, effective one-on-one training. Drop-in training in medical records where we had up to three or four nurses waiting to train the doctors on how to do electronic signature in each of the facilities so that physicians by and large did not have to wait. We had training available for a period of about 4 months after go live so that in any given facility there might be 500 physicians needing to learn it any time. That three to 4 months they could drop down and pretty much not have to wait in line to get trained. And they came back for follow up trainings. So again, lots of support and plenty of it. And what I mean by success was pretty much the ''buzz:'' If the buzz was too negative, we might have to pull it back or restrict it or just say it's not ready to be implemented. But the buzz was, ''Well, it had warts, but you told us about the warts and then there was good buzz on it and that in general there was less negativity from, the physician leadership than I would have expected. So to define success was that, in general, there weren't calls from the leadership to throw it out (laughter).

3.5.2. Failure story

Q: ... Having a wonderful experience with the ED order entry (laughter), we thought the last remaining bastion that we had to cover was a group of nursing homes that physicians from our group covered. And we thought ''We'll start slow'' and we chose a hundred and twenty bed facility just located adjacent to one of the hospitals. Six geriatricians who are already using the system in their office practice and in inpatient were covering the nursing homes.

Table 1 Definitions of success and failure by storyteller

Definition of success	Definition of failure
Did not have to pull it. Avoided the ''destructive step'' of withdrawing it	Had to pull back ... and risked entire project
No calls from leadership to throw it out. Good buzz	Rather than receiving good buzz, did not make a blip
Eventually able to roll out the system ...	''From my perspective it was a failure'' because clinicians went to a different way of doing things than originally envisioned
Able to meet clinical needs of the users and let them say 'yes' this will work and it is acceptable to go forward ...	Had to revamp everything including how equipment deployed. Needed to provide 24 h clerical support to manually enter data to prevent complete failure
Able to actually install a system, a brand new system, throughout the whole organization that included the emergency department.	Pulled back from units where physicians objected to entering data. Wanted to go back to old way of doing it. Implementers did not want to pull back, but had to pull back when resistance felt
Did not successfully get to go back to the old one. Using the new system	Successful in replacing system but users disappointed to feel functionality taken away, did not feel system as good as it could be or matched commitment to health care; loss of some credibility
After giving them what they asked for, but not what they needed, able to partner to improve. Now on national news talking about the system	Pulled the plug
It worked. ''We were armed for bear and nothing happened''	Tried to implement, turned it on, pushed for 2 weeks, and turned it off. Have not tried again
Change over from paper based to electronic orders on regular nursing floors; 85% of orders being placed by physicians into the system ...	Customers involved in early stages of rules engine development never migrated to version II and turned it off
System was fully meshed with work practices, and practice changed; mutual influence of technology and medicine. Failure because of localization problem.	Failure—an abortion of the system. Comes back to 'success or failure in the eyes of the beholder'
People who were originally resistant, now in a position to ask for more.	Had to shut down forms and documentation to make iterative changes.
''Don't get many complaints about entry; people now complain about other aspects ... accepted as 'this is the way we do it''	Successful failure resulting from premature implementation; near meltdown in terms of acceptance. Pulled back from not only ICU but other medicine wards as well
''Implementation did not teeter off the edge''	Not a system failure but a communication failure in an otherwise successful implementation of CPOE

So we had a group of experienced users and the new director of the nursing home, [who] used to be a head nurse on one of the hospital units ... that was a wonderful thing. She knew the system, been through implementation a couple of years before. And we assigned a Clinical Application Specialist, a CAC type of nurse who was very clearly in the system to be the primary driver for it. And [we] freed up her whole time for this 2 months that we planned to do this. We actually had a lot of time because in fact you know there's just *weird stuff* about nursing homes. They have orders like ''Patient may see dentist PRN,'' that you just don't encounter and, we knew that stuff was there. And we planned for that so we had the Clinical Application Specialist actually enter all the patients' orders for a month and a half into the development system and we created new orders and stuff as we needed, so in other words she hand entered orders so we could make sure we covered all the cases and things and that was great and laborious.

We put [in] a device for about every ten beds, which is equivalent to about four or five on every nursing unit in the nursing home. And there was only one geriatrician rounding at the time so we thought twenty devices. That was that. And we tried to implement it and we pulled it, turned it off and hadn't turned it back on yet. The problem was that when patients went from the nursing home to the emergency department where we also do order entry, we had this profile conflict. In other words, they had a set of orders in the nursing home and where

Table 2 Success and failure factors by storyteller

Success factors	Failure factors
People agreed it would happen; vendor was stable; lots of informal communication	Did not recognize complexity; misallocated resources; needed to start narrower and meet more
Training, and follow-up training; recognition of weak spots—no overselling	Mandated across states—different economies and politics; money not enough: need smart people, good leader and people who know how to use the system; not asked if needed; no one accountable
Learned from pilot to adjust goals; listened to customer; recognized when software not mature enough; involved people in project management	Only 50% using system; hardware problems; inadequate training; lack of attention to clinical needs; Wrong process for finding solution
First unit was a failed experience. Solved problems on the fly; clunky work arounds; testing until 'good enough to go;' mass customization	''Too cocky;'' needed to wait, to analyze workflow to be sure a good fit for new unit; should have been foreseen; expensive failure; ''opportunity'' cost
Solved several problems before moving forth; moved slowly, unit-by-unit; clever ideas for eliciting support and feedback. Used employees from successful units to train others	Lab sets: easy module to install but consequences were not very good. Did not anticipate how change would impact physician rounds
Cannot tell where CPOE stops and rest of clinical systems begin; some of the functionality was going away, but new functionality appreciated	Insufficient analysis of how deeply old EMR embedded; insufficient commitment to replacing functionality; overblown expectations
''It was a disaster.'' Positive partnerships; one-on-one training; conditional order functionality; real determination to move forward; most of the problems in the specs not the implementation	Pharmacy revenue down since charting compliance down; minor bugs not acknowledged; not proactive enough predicting what would happen. Later, could see it coming: high turnover, too many choices, too intricate. Not enough trust in vendor/organization relationship to say ''this is not working''
Worked with other units; process was smooth. Physician implementers knew workflow intimately; made minor adjustments; set up relevant choices. Made sure there were lots of devices	Group of nursing homes: failure to recognize profile even having spent a great deal of time in implementation. Lots of turnover in nursing home staff. Special patient type leaves and comes back
Rolled out in two phases; prototyped in one unit until 'got the bugs out;' stopped → made change → implemented in larger areas. Dealt with function of the system rather than complexity; got buy-in	Took too much time between versions, and in the meantime client found alternate kludges with main system
Mutual influence of technical and medical [knowledge] made the system 'fit like a coat around the work practices of the unit'	Replaced system without understanding clinical work. Resistance grew as it took more work; created large backlog; Did not anticipate how work patterns would be changed
Creative middle ground: ''when they said 'no way,' we asked 'what can you live with?''	Too much data output, so much that user could not trust that all data was there
Start low and go slow; longstanding gradual availability; increased support; endorse mandatory use; retained fail-safe. Delaying implementation after pilot	Inadequate system response time and difficult order entry. Problems with applications in time sensitive environment. Listened to staff; improved management credibility by pulling back and rethinking process; upgraded hardware, waited until new version of software
Flexibility; pharmacists reworked orders, so could be seen as a failure but saved the entire implementation	Nursing communication suffered significantly with CPOE; multiple communication channels; written chart might have involved nurse at the bedside

a system is set up, is that they're admitted to the nursing home and so you write daily nursing home orders until they are discharged [but] the nursing home does not discharge people when they send them to the ED so we get into this very complex tangle about profiles that we are still working to untangle. We haven't been a high level effort but it's been the last year and a half that's had some level of activity trying to get that sorted completely out and we might be getting close to that.

So, the primary failure was the failure to recognize that profile but there are other things that

showed their ugly heads. We pushed for 2 weeks before we turned it off but because we thought we did find some way to overcome it, but the other problem that we found is that the nursing home has this huge turnover in terms of nursing staff ... we could not find a model to keep up with the training and things like that. There were some other little things it would have been nice to do, but the real big one was this profile problem that, in retrospect, was obvious but it just did not enter anybody's head.

4. Results

Data were reduced into a partially ordered matrix display that appears in Table 1. In this instance, partially ordered refers to the pairing of success and failure factors in the order of presentation by the participants. The interpretation of the data is key in qualitative analysis, and this will be discussed below.

An important consideration in interpreting the results is that the unit of analysis—the implementation itself—varied from storyteller to storyteller. The activity discussed could be the implementation of CPOE throughout an entire hospital system, or a particular unit, or a specific aspect of CPOE (such as electronic signature or drug orders). It was generally the case that people talked about specific aspects of CPOE that succeeded or failed rather than the overall implementation.

5. Discussion

Early on in the process, one of the POET members suggested that success means the system remained operational and that failure meant that the system had been pulled. While an analysis of the stories indicates that success and failure cannot be so easily defined contextually, it is true that all participants defined success in terms of the implementation's persistence.

One of the questions that arose during the storytelling portion of the day was: is success always preceded by failure? This question is interesting when considering how many people began with the down side when discussing success and eventual implementation when discussing the stumbling blocks.

The way to interpret these results is within the theoretical framework of social constructionism which takes the position that individuals construct their view and meaning of reality in context within a social world, accepting that there are multiple realities and views of any given situation and that this interpretation is fluid and can change relative to culture, history and location [13]. The participant group was designed to represent a number of different stakeholder groups, settings and systems. It is not surprising, then, to discover that while the definitions of success and failure were similar, the antecedent variables were more diverse. Some storytellers indicated that implementations may have been viewed as successes or failures on some level but not from the perspective of the storyteller. That is, the implementation may have persisted, but the storyteller felt there was a failure because an initial goal had not been reached.

Storytellers were cognizant of their own construction of reality (''from my perspective it was a failure'') if the envisioned, ideal system did not succeed even if some type of order entry was alternately put in place. In other words, failures were not the obverse of success. It was not necessary that the system be pulled to deem an implementation a failure.

Failures ranged from system withdrawal to changes in original system design to failure to make an impact (or buzz). Delayed rollouts were seen as failures if implementation activity was stopped for some time, although some participants felt that waiting after pilot testing is what led to their success.

6. Conclusion

Each of the 13 participants of the Menucha conference brought a success and failure story to the table. In almost all cases, failure stories had been turned around and were antecedents of eventual successes. Some success stories were preceded by exclamations such as 'it was a disaster.' The obverse of this was the proclamation that a failure was a 'temporary setback.' While multiple perspectives were represented, and crosscutting themes established, there was consistency between participant's definitions of success. Failure was less easily defined and highly dependent upon the context of the implementation and the perspective of the storyteller.

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