Linking occupant complaints to building performance

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Abstract

Building operations connects the building, its performance, and end-users. When there is a mismatch between users' expectations and operations processes, complaints can arise. This paper investigates whether adopting enhanced complaint handling processes can help diagnose performance problems. Using two LEED platinum-rated office buildings as cases, we describe the components that make up an enhanced complaint handling process, and discuss some of the social dynamics of complaints in buildings. We suggest that enhanced complaint handling might contribute to a form of ongoing commissioning that goes beyond primarily reactive or dismissive treatments of complaints.

Introduction

Building operators link the building as a technical system to its occupants and shape the energy consumption of the building as well as other aspects of its performance (Aune et al., 2009).Where occupant expectations diverge from the conditions a building's systems produce, complaints may arise. These complaints are a form of feedback to the building operators. They suggest where more or better management may be needed, whether in changing technical aspects of the system or influencing occupant expectations. Using two US LEED Platinum-rated buildings as examples, this paper examines some aspects of complaining and complaint handling in buildings, and suggests that improved management of complaints can provide building operators with information to manage their buildings more effectively.

Dealing with complaints and the possibility of complaints is fundamental to the work of building operators and facilities managers. In fact, according to the operators interviewed here, much of the core work of many building operators is responding to complaints. There is a parallel and common tendency to be dismissive of complaints –especially when there is no ready solution, or the problem appears trivial. Yet, despite the practical salience of occupant complaints to building operations, there is rather limited academic literature about them, how they work, and what they reflect.

Several studies treat complaints from a relatively technical perspective. For example, Federspiel (2000) addresses thermal complaint prediction, and Friedman (2004) provides detailed guidance on diagnosing hot and cold complaints. Baird and Dykes (2012) use satisfaction survey data to consider the relationship between complaints and overall satisfaction. With a less technical orientation, facilities trade organizations have outlined common building complaints as reported by facilities managers, focusing on the most common kinds of complaints (IFMA, 2009).

Yet, buildings are complex social, technical, and organizational systems; so much of the value of the complaint is missed with a purely quantitative or technical examination. In reviewing occupants' comments about their buildings, and in listening to what building operators say about occupants, complaints and how they are handled or dismissed is an important and underexplored area that helps to explain why buildings perform as they do rather than as designed, that shapes occupant satisfaction beyond the technical description of a building, and that exposes some elements occupants want in buildings but do not get. For these reasons, this paper advances a dialogue speaking to complaint handling and dynamics and puts forward questions about the nature of complaints and how their regular examination can aid the understanding and management of operational linkages, and thus support better building performance.

We examine the operational contexts and practices of two US LEED Platinum-rated office buildings as case studies. In each of these two buildings, we conducted an occupant survey as well as a facilities staff survey, both based on survey instruments developed by U.C. Berkeley's Center for the Built Environment (CBE) (Zagreus et al., 2004). We conducted on-site interviews with building operators, facilities managers, and the design team, allowing a more open-ended investigation of how complaints and problems are handled, and following up on some of the issues raised in the surveys. Our analysis also draws occasionally on interviews conducted with some twenty other building operators and facilities staff in California and on a building energy research workshop developed about operator-occupant interactions and building energy use.

These US buildings are not representative of US office buildings as a whole, nor is complaining in US buildings the same as it is in other countries – with the nature and dynamics of complaining depending, for example, on notions of customer service and expectations about physical conditions. We do suggest, however, that the high expectations for performance in green buildings are a good basis for thinking about the prospects of better accounting for occupant complaints.

Complaints and building performance

We use the term complaint to mean a statement that a condition is unsatisfactory or could be improved. When there is a mismatch between the conditions that building users expect or want and the way they see a building operating, users may complain. Given that these complaints represent an evaluation that a feature or element of the building is underperforming, they relate to building performance in a very direct way. Additionally, they link end users and the technical systems of the building. Aune et al. (2009) calls complaints 'the missing link' for this reason.

The extent however, to which buildings are actually designed or operated with the intent to please users is less clear; costs, aesthetics, standards and codes, and theories of how to ensure productivity may readily take precedence. Yet, even when occupants are considered in operations practices, the diversity of occupant preferences, activities, and local environments in any building make operations a complex activity. This diversity is acknowledged, for example, in the thermal comfort performance standards that buildings are encouraged to achieve. The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 55-2010 suggests that 80% of occupants should be satisfied with the thermal conditions in a building, based on extensive laboratory tests (ASHRAE, 2010). The International Organization for Standardization's Standard 7730 suggests that 90% or more of occupants can be satisfied (ISO, 2005). While the limitations of the statistical data and definition of these standards have been much discussed, the specifications suggest that a high majority of occupants can be pleased, while accepting that a relatively small percentage of occupants will not be satisfied, whether due to the occupant being outside the norm for "predicted mean vote" or due to local thermal discomfort.

In practice, however, 43% of surveyed occupants in the 575 buildings in CBE's Occupant Satisfaction survey database report that they are *dissatisfied* with temperature in their workspaces. While the survey data is not completely parallel to the ASHRAE standard definition, it seems clear that the thermal satisfaction of commercial building occupants is generally far lower than standards would indicate they should be. The same is true for several other aspects of indoor environment quality (IEQ). Buildings designed to meet particular performance levels may often fail to do so once in operation (see table 1).

Whatever the source or cause however, it is the expression of dissatisfaction --the complaint--about a building condition that is of concern here. Since a single complaint may involve many aspects of a building simultaneously, or even deal with issues that fall outside the standard technical canon of IEQ factors, the analytical and systematic study of complaints may offer new insights into many building-related concerns.

Types of complaints

We distinguish two general avenues for complaints: volunteered, and solicited. Volunteered complaints include the building-related requests occupants make to operations staff, facilities, or human resources departments, whether through formal complaint or work order systems, simpler phone calls and emails, or even conversations in the hallway. The most familiar of these complaints are "too hot" and "too cold" (IFMA, 2009) but there are many other types: ventilation drafts, noisy neighbors, janitorial practices, etc., that are not necessarily under the purview of building operators. Commercial complaint and work order systems are available to capture these (e.g., easyworkorder.com), though many companies devise their own, or, in smaller organizations, there may be no formal process.

The reasons an occupant might volunteer a complaint vary; but presumably, complaints are volunteered primarily because the occupant feels that there may be a benefit in doing so. Complaints arise because something about the environment is causing them physical or psychological discomfort, (Vischer, 2007) or could be done better, in their view. Occupants might also find value in just airing a grievance, even if they do not anticipate any response. As building operators and facilities managers that we interviewed pointed out, occupants vary greatly as to their propensity to complain. Some are "scared of leaves and kittens" (to use the words of one operator), while many just try to cope on their own, without necessarily knowing that complaints can be made or how to do so. Other occupants, according to our interviewees, "complain all the time." These differences underscore that complaints are not necessarily a snapshot of occupant experience parallel to statistical representations or laboratory experiments.

In contrast, solicited complaints are collected by specific request, such as in an occupant satisfaction survey. They are shaped by what the requestor asked. Depending on the context of the survey, the respondent may rarely expect a response to the complaint, nor necessarily be able to convey how big a problem the complaint represents.

Using CBE's Occupant IEQ Survey as an example, survey respondents are asked to rate various dimensions of the indoor environment by satisfaction level, e.g., on a 7-point scale from “very dissatisfied” to “very satisfied.” Here, the complaint is framed by the survey question itself. These questions can cover aspects that may matter greatly to the occupant as well as those that are basically irrelevant. While potentially useful in understanding occupant experience, this kind of survey might also cover building features or conditions that occupants care little about, while missing issues occupants find especially important, annoying, or easy to fix (Moezzi and Goins, 2011).

It is reasonable to assume that solicited complaints are less common than volunteered complaints. In the U.S. at least, feedback surveys are not routine and may happen only for specific reasons, (e.g., LEED certification) if at all. It can also just be uncomfortable to ask for or solicit such feedback. Some organizations may also fear that occupants expect direct action related to their complaint and that occupants may even take more aggressive action if no response is received. Less severe organizational concerns are also possible, such as workers using 'company time' for a noncritical activity like a survey. Any or all of these concerns limit propensity to solicit building-related feedback and complaints from occupants.

Volunteered complaints, on the other hand, usually come with the expectation that there will be some sort of response, even if not a physical change. Additionally, volunteered complaints may arrive via a number of routes and are more difficult to track, though building work order systems can offer a valuable trace. Given that the kind of complaint affects modes of response and arrival, the kind of complaint may have implications for complaint handling as well, which we discuss next.

Complaint handling from the perspective of marketing

Our discussions with building operators and review of occupant comments on building satisfaction surveys underscore that there is a great deal of popular opinion about building complaints and their handling, which we do not try to sort out in the current paper. Instead, this section focuses on one complaint handling approach that lends itself to a richer engagement with users. Here we discuss how marketing literature envisions complaints and their handling.

In the marketing realm, solicited complaints and feedback are often considered ways to improve customer satisfaction and support higher profits (Rust, 1992; TARP, 1986). This canon sees complaints as potentially valuable input that can lead to improved products, services, and customer relationships (Solomon, 1985; Zeithaml, 1988). For these reasons, feedback from customers may be reflected in future releases of products. Folding user feedback into revised products might be considered a kind of user-centric ''ongoing commissioning'' of them, where the products are regularly reoriented such that they meet user needs. Given this, it is logical to consider how this same complaint handling style might apply in the commercial buildings realm and also support ongoing commissioning to meet commercial building occupant needs more fully.

Despite the potential benefits of customer complaints in improving service, products, and customer relations however, the same literature also calls attention to the fact that organizations often take a defensive position toward complaints: "see no evil, hear no evil, speak no evil" (Homburg and Furst, 2007). Homburg and Furst identify three modes of defensive organizational behavior with respect to complaints: (1) not actively seeking feedback from dissatisfied customers and not reacting well when complaints are received; (2) not efficiently transmitting complaints to the proper parts of the organization (see also Harris et al., 2010); and (3) not effectively using the information in complaints to improve service or offer redress to customers. Each of these modes impedes or blocks the discovery of information embedded in complaints.

Similar defensive patterns are likely common in some operating buildings as well as evidenced by complaint handling patterns observed during our interactions with building operators and facilities managers. One work order management software provider summarizes, “Complaints are a dirty word in the Services business.”[i] In later sections, we will examine the extent to which the operators of the case buildings are able to capitalize on the information embedded in complaints by gathering and analyzing them.[ii] Do they use them to influence, and hopefully improve building functioning, or hide, sabotage (or even defer to) them? Given the prevalence of complaint deflection strategies described in customer service literature (Rust, 1996), similar behavior is likely in commercial buildings too, especially where occupants are seen as customers. The potential implication of complaint deflection in commercial buildings is taken up in the next section.

Complaints in commercial buildings

Complaint handling and reputation risk

Based, on our interviews with facilities personnel and building energy researchers, it is clear that some facilities departments may be highly sensitive to complaints-- or at least complaints from certain people. The extent to which a given complaint is considered worthy of a response, is taken at face value or even just considered to be a legitimate assessment of physical conditions is often a function of who is complaining (power, reputation, gender, established relationships, etc.) to whom and in what management context (government building, owned or leased, etc.) In turn, expectations about this treatment will influence complaints themselves: who will complain, about what, and with what expectations. Complaint handling is often not a democratic process.

Power and influence matter in the realm of complaints, and both are often leveraged to heap additional organizational pressure on operators to resolve occupants’ perceived IEQ or operational performance issues, which can render some complaints sensitive indeed. This sensitivity to complaints may, in turn, lead to a conservative mode of operations in anticipation of possible complaints, for example, HVAC schedules that start much earlier or end much later than occupancy. Conservative operations of this sort may result in a smaller number of complaints, but not necessarily better --and maybe even worse-- building performance.

Operations organizations may also see complaints as embarrassing or threatening (Argyris, 1990) rather than as an opportunity to fix problems in the building. The affected operator especially may prefer to curtail complaining as a form of reputation management. In fact, this may be the norm rather than the exception. One building operator we interviewed, on an outsourced operations team, made it particularly clear that complaints (not necessarily building performance issues) can be very damaging to a company’s reputation.

For commercial buildings, the informational benefits of complaints as espoused in marketing literature then might be overshadowed by the reputation threat that complaints represent. Complaints may contain valuable information, but they also include information about someone's (or some building's) failings. Thus, while complaints are sometimes handled candidly, the basic human and organizational, reaction to occupant complaints that are not too visible may be to suppress them.

Reactive and proactive complaint handling

Another option may be a reactive/proactive style of complaint management that resolves individual problems, but that may also be more about making the complaint --rather than the actual building performance issue-- go away. In short, if in buildings, occupants are the customers, the job of the operator may become occupant satisfaction (Barrett 2003; Cotts, 1998) not necessarily building performance. This is a natural perspective for buildings that outsource all or part of their operations functions.[iii] Complaints in this scenario then, represent dissatisfaction and can become highly sensitive politically and even personally.

In other cases, however, perhaps particularly when services are not outsourced, operations may be pegged to other stakes, for example, maintaining design temperatures or controlling capital outlay. In this scenario, other issues of importance to different stakeholders drive operations practices and thus may influence operation reactivity more than occupant complaints. In fact, complaints may not be sensitive matters at all under these circumstances. Instead, complaints here can be dismissed as technically unsolvable, a complainer can be handled by telling them that the problem does not exist if the building appears to be meeting design standards, or cannot be fixed due to budgetary concerns.

Research scope and intent

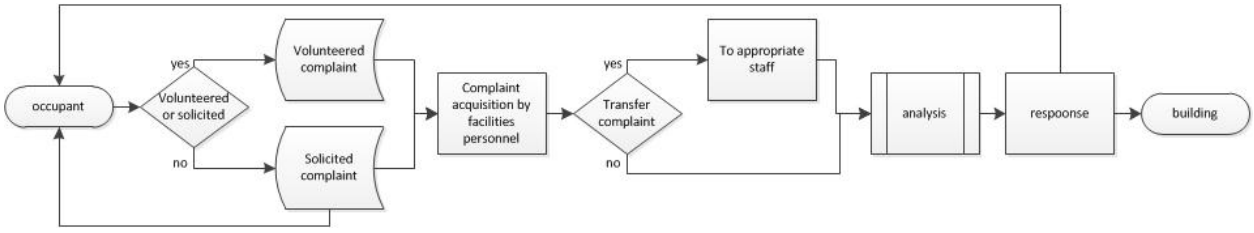

Figure 1. Basic model of complaint handling.

Based on the components identified in the literature and discussion above, a working model of complaint handling for use in ongoing commissioning in commercial buildings might look like that presented in figure 1. The process includes actively gathering solicited and volunteered complaints, and in some cases soliciting occupant feedback and complaints through surveys or post-occupancy evaluation. It further suggests that transferring the complaint to appropriate staff is important, includes analysis of complaints, and encourages feedback to occupants and changes to the building in response.

The model is also a cyclical process so that complaint gathering and analysis happens in a more or less regularized way. The cyclical nature of the process is what may promote more developed and rounded notions about building issues such that when a new complaint arises, operators can respond with a more developed understanding of the issue, rather than in a less informed and conservative or reactive way. In short, the process presents the opportunity for operators to access more information, which in turn, at least theoretically, may support better solutions to building performance problems. This additional information is revealed via the analysis step of the model, which might include some or all of the activities described in the methods section to follow, but could also vary based on specific building needs. The nature and scope of this analysis step is a part of what we address subsequently.

We do not attempt to quantify changes in system function, energy use, or comfort here. Rather, we highlight the potential importance of complaints and offer examples about how and why complaint handling processes did or did not identify systems, energy, or comfort-related problems in two specific buildings, each in a specific context. In fact, our process attempts to exploit or use each building's context, rather than minimize it, to provide a more complete and rich understanding of operational linkages and complaint handling in these buildings. This necessitates limiting our study to a small number of observations so that a fuller understanding of the character of a complaint handling process is revealed rather than its extent in practice. At the same time, our two cases -- LEED Platinum rated buildings represent outlier cases (USGBC, 2012) when compared to the commercial building stock overall. This lends to the possibility of rich findings related to complaint handling and operational practices over and above an average or standard building.

Given the small sample, opportunities for our results about specific building performance issues to be generalized to other buildings is limited. Still, this work produces a method that can be used in many buildings to leverage their unique contexts to more effect, which we show there is much benefit in doing. More tools and methods to diagnose complex building performance problems can only help close the gap between predicted and actual performance. Better complaint management and analysis may represent a low-cost and accessible approach for diagnosis.

Case Study Buildings

Two commercial buildings in operations are cases for this study and were chosen because they represent similar operational and occupant contexts, but are very different kinds of buildings. Both organizations utilize internal and external operations staff in highly similar ways. The internal staff field occupant complaints, handle procurement, and deal with administrative tasks. The outsourced operations staff runs systems, responds to work orders, and interacts with occupants as needed. Occupants in both buildings are largely knowledge workers and have access to a number of comfort controls including task lights, airflow diffusers and window blinds, though they do not necessarily use them as designers intended.

The first case (Small Midwest) is a 26,000 square foot, LEED-NC Platinum low-rise office building, completed in 2006 in the Midwest of the United States. It houses about 65 people. This building has only one tenant and is owner-occupied. It also includes a number of sustainability features such as super-insulated walls, ground source heat pumps, underfloor air distribution (UFAD) with adjustable diffusers, daylight and occupancy controls, and light shelves. It has an internal operations staff of one person and an outsourced staff of three. This building was studied during winter and summer of 2009. The building had no formal complaint handling process before our study. This may have been due to the building's small size.

The second case building (Large West) is a thirteen-story, 500,000 square foot office tower in a hot-dry climate in the western United States, completed in 2009. It houses about 600 workers on a typical workday. This building also has only one tenant, is owner-occupied and is both LEED-NC Gold and LEED-EBOM Platinum certified. It includes a number of features aimed at reducing energy use while promoting occupant comfort, including UFAD with adjustable diffusers, daylight optimization, and heat pumps. In 2010, the building achieved an ENERGY STAR rating above 90. It has an internal facilities staff of four and an outsourced staff of four. This building was studied during summer and fall 2011. This building's operations teams developed a multi-tiered complaint gathering system including surveys and an electronic 'suggestion box.'

Data collection

We performed an occupant survey, an operator survey, an operator interview and a site visit and tour for both case buildings. CBE's web-based IEQ survey was used to gather data on occupant satisfaction and dissatisfaction. These data were compared to CBE's benchmark IEQ dataset of 575 buildings. Individual buildings are included in the benchmark set if they have a sufficient response rate and use the standardized version of CBE's survey. We interpret survey responses indicating dissatisfaction as solicited complaints.

In each source of dissatisfaction page and at the end of the survey, respondents were provided the opportunity to write in free text comments. Occupants wrote over 1,800 comments between the two buildings. We take these free text comments to be volunteered complaints.

Operator perspectives were gathered during 60-minute group interviews and a site visit. The interviews covered topics such as operators' sentiment towards energy, occupants, occupant complaints, and the building itself. Operators were also asked specific questions about operational issues via CBE's survey for facilities managers.[iv]

Method

We used this data to address occupant complaints at several levels. The occupant satisfaction survey data was used to characterize what occupant said that they were satisfied with and dissatisfied with in the case study buildings. At a higher level, we sought to address whether the operator largely responded to complaints as one off events or operated with a perspective that balanced building performance, occupant comfort and other stakes, this being potentially important to preventing reactive or conservative operations practices. Finally, we investigated the completeness of the complaint handling process itself to understand if a complaint resulted in a feedback loop between the building, occupants and operators, or whether complaints were suppressed, dropped or ignored.

The closed-ended portion of the occupant satisfaction survey data (n=567 respondents across two buildings) covers seven IEQ areas: office layout, furnishing, air quality, acoustics, light, temperature and cleanliness and maintenance (Zagreus et al, 2004). Data are collected on a 7-point scale (“very dissatisfied,” “somewhat satisfied," “slightly satisfied,” “neither satisfied nor dissatisfied,” “slightly satisfied,” “somewhat satisfied,” and “very satisfied.”). When respondents indicate dissatisfaction in one of these areas, they are asked follow-up questions about the source of their dissatisfaction. These data were analyzed to characterize the kinds of issues occupants complained about in these buildings and the prevalence of these complaints in relation to CBE and IFMA surveys.[v]

The four operator interviews and occupant free-text comments were used to characterize the processes, dynamics, and outcomes related to complaints within the case study buildings.[vi] Operator interviews were examined both as a system of perspectives by contrasting them with occupant comments in the same building to understand both sides of the complaint handling process, and individually as a series of themes about the technical, social and organizational dynamics and performance issues present in the building. Occupant free text comments were analyzed individually to understand specific interactions, sentiment about that interaction and the occupants’ perspective about the outcome from complaining. The results section presents discussion about this kind of context from both the occupant and operator perspectives and exemplars of volunteered complaint types for these two buildings.

Results

Solicited complaints

We used the occupant satisfaction survey data for the two case study buildings and compared the results to those for buildings in CBE's benchmark IEQ dataset of 575 buildings. Almost 90% of surveyed occupants in the case buildings say they are satisfied with the building in general (table 1). This is considerably higher than the satisfaction rate for the CBE benchmark data base, where only 66% of surveyed occupants say that they are satisfied with their buildings.[vii] Thus, the case buildings work substantially better than average from occupants' perspective. They are both among the higher scorers in the CBE set of 575 buildings. In particular, satisfaction with thermal environment and air quality are quite high, though acoustic satisfaction in both buildings is close to par.

	Small Midwest	Large West	CBE benchmark
General Building Satisfaction	89%	89%	66%
Acoustic Quality	49%	37%	40%
Air Quality	81%	73%	51%
Cleanliness	79%	89%	
Lighting	77%	75%	70%
Thermal Comfort	77%	61%	37%
	n=57	n=500	n=59359

Table 1. Comparison of occupant satisfaction results for the two case study buildings and the percentage of occupants who say they are satisfied with their buildings overall.

Much of the tuning associated with commissioning is related to understanding what does not work in a given building. Additional questions from the survey provide this information. Occupants in the case buildings are largely satisfied, but they can and do offer complaints about items that are not quite working yet, at least from their perspectives, which, in turn may suggest where improvements could be made.

		Small Midwest	Large West	CBE database
Temperature	Too hot during hot weather	13%	7%	21%
	Too cold during hot weather	16%	10%	22%
	Too hot during cold weather	16%	6%	14%
	Too cold during cold weather	14%	13%	26%
	My area is hotter/colder than other areas	9%	6%	9%
	Thermostat is inaccessible	6%	-	1%
	Thermostat is adjusted by other people	17%	-	1%

Table 2 --Percentages for selected solicited complaints by IEQ factor. Only dissatisfied respondents were offered these questions.

Table 2 shows response percentages for specific complaints in each building.[viii] Over 20% of those in the CBE database who say that they are dissatisfied with temperature in their buildings report sometimes being too cold in the summer. And from a different source, a 2009 survey of operators also showed that over 50% of their sample of about 400 buildings had cold complaints during summer as well (IFMA, 2009). Summer overcooling is clearly a persistent problem in some operating buildings; and it has implications for both energy use and occupant experience (Mendell, 2008). The case study buildings perform better in this regard, both having less than 20% dissatisfied with summer overcooling.

This kind of context about IEQ performance may be especially useful when considering how operational issues or linkages should be managed differently, or not. It contributes to a kind of user-centric, or at least user-aware ongoing commissioning process, where reported performance from real users ---versus trend logs of sensor readings, which are commonly used in commissioning processes-- can be compared to design intent and be used to "tune" the building accordingly. ASHRAE's Protocols Measurement Protocols (PMP) for commercial buildings (2010) suggests a similar approach for this very reason, where an occupant survey and physical measurements are analyzed to ascertain current performance and to develop an intervention toward improved performance.

Volunteered complaint themes in Small Midwest

Small Midwest was intended to be a demonstration project and a regional model for green building practice. In many ways, the project successfully fulfilled its role. It met the ASHRAE Performance Measurement Protocols for Commercial Buildings (ASHRAE, 2010) in lighting, acoustics, and potable water quantity (Goins, 2011). It was also a model for biodiversity in landscaping, and outdoor water use. Additionally, the building got high marks from occupants in thermal comfort, air quality, and lighting among other items. Occupants also enjoyed the building's aesthetics. Occupants were generally positive about the building's green intent and the individual building operators, even if some aspects of the building and its operations were not perfect.

Complaint management however, was not included in this forward thinking notion of 'greenness' as there was no formal complaint process in use here. Any of the 65 occupants simply made requests of in-house or outsourced operations staff, but most complaints in the comments we analyze here were directed at outsourced staff.

The size of the building's population may have played a role in the decision to forego a complaint handling process. It may simply have been easier to handle complaints informally rather than with a formal process. This decision however, left some energy saving opportunities unexplored and some occupant questions unanswered. For example, while the operators may have known how the building's green features worked and how they were to be used, it was likely the occupants did not. A number of occupants complained that the building was too dark even though it took advantage of natural daylight, over 2/3 of occupants had task lights and access to a light switch for overhead lights. A number of comments also mentioned that no one used the switches and that lights remained on when not needed.

Light switches and task lights are among the more simple building elements occupants encounter. Without information from operations staff however, occupants were not able to create the conditions they needed, and the building likely used more lighting energy than was necessary. As has been found in other green-intent buildings, users are not necessarily informed of how controls are supposed to work, potentially resulting in confusion and missed opportunities (Brown and Cole, 2009).

Additionally, the lack of a complaint management procedure left the escalation process unclear. What happens when problems are not fixed or cannot be fixed? The complaints we heard from occupants and operators suggest that this issue was a pivotal one for this building. The following complaint describes a lingering and unresolved HVAC problem in Small Midwest.

Exemplar comment:

> *Building management has decided to respond to individual staff complaints about temperature and adjusts the system accordingly. However, the system is interconnected, and this causes others to be affected. This approach is inefficient in the extreme (from an energy standpoint) and inconvenient. If I had a window, I would open it to breathe when it gets to 78 degrees, but cannot. Policy should be one temperature for all areas: 72F.*

This comment is instructive since it has energy and IEQ implications and speaks to complaint dynamics. It suggests that, in an attempt to serve occupants, operators changed operating temperature parameters to defer to certain complaints. There are several comments suggesting similar deferral. This deference to one complaint often left other occupants elsewhere in the building less comfortable than they were previously. This sort of negotiation and the attempt to find balance is part of the everyday work of building operators, but certainly managing complaints does not necessarily coincide with ideal management of the problem from the point of view of managing building performance. In this case, at least certain occupants had some control of HVAC temperatures via a “complaint,” while others may not have experienced this route of control. Note also that this occupant (and others) was aware of energy efficiency and thought this largely deferential approach to be wasteful.

Occupants in this building frequently praised the building operator for his dedication to solving their individual problems, for example, sweeping an office where the occupant had complained that the cleaning service was inadequate, and so on. However, satisfaction with the building’s “greenness” and appearance, and with the building operator, does not translate to satisfaction with the heating and cooling.

> *I'm very proud to work in a green building. The building's architecture is gorgeous. I love all the natural light. The pond makes us a little oasis in the desert of sprawl. Building management works very hard to make us comfortable here. I wish we could get the heating/cooling to work better; the temperature really varies throughout the building, without much rhyme or reason.*

The building management worked hard to keep occupants happy and responded to many of their concerns in a timely fashion. Still, as the comment shows, this approach did not always solve issues for occupants, and often created other IEQ problems. Conversations with building management staff revealed a similar story. The operators were aware of these occupant complaints, but had not found ways to handle them that seemed to satisfy the many organizational, social, and technical requirements in concert.

The outsourced operations team that we interviewed was the second company employed at this building. The first company's contract was terminated when they were unable to provide sufficient comfort for occupants. This back-knowledge may have driven much of the current company's deference and reactivity to occupant complaints --they were concerned that their contract would be terminated if they could not keep occupants' happy as well. However, a deferential, short-term mode of addressing problems can be at odds with overall occupant comfort and building performance, as is borne out in the exemplar comment.

Reflecting on Homburg and Furst's trio of defensive organizational behavior regarding complaints, complaint acquisition was a problem here. Once complaints were received, operators were eager to use the information they contained. In the absence of the ability or agency to gather these complaints and make the case for the more drastic, and perhaps large-scale operational changes needed, deference to individual complaints became the next best option, even sometimes at the expense of building performance or at the expense of other occupants' comfort. Some complaints demonstrate that both the operators and occupants were aware of the energy consumption and comfort consequences of the current reactive operations approach, but that operators lacked a method to address these problems.

Interestingly, the outsourced operations company used the survey results we obtained from this effort to support operations actions that the in-house operations team initially resisted. Changes to the air handling system, including relocating air diffusers and adjusting settings, were made in response to survey results about thermal discomfort. For example, air diffusers had been placed under occupants' desks, which meant cool air blew directly on their legs. In-house operations resisted moving the diffusers because of aesthetic goal to keep the diffusers under desks and out of sight. Once the extent and intensity of thermal discomfort was documented via the survey however, in-house operations had more than the 'anecdotal' evidence from the outsourced operators to justify the change. Thus, the survey activities that researchers undertook here represented a kind of complaint collection process that the operations team might have benefitted from using at other times as well. It also provided evidence and rationale for making important changes, helping overcome more socially or organizationally challenging problems.

The complaints gathered in this process offered information about specific building performance problems, and this information was useful from the operators' perspective. It served an organizational purpose, to help make the case that action was needed. Occupant satisfaction surveys, as a mode of requesting complaints, may also support moving from a simple reactive mode of operations, where each problem is handled separately, to a more informed and rounded diagnostic approach. Understanding the scope of user-identified problems, in combination with soliciting feedback, supports making adjustments to operations that take better account of all occupants, rather than increasing one occupant's satisfaction at the expense of another or otherwise responding with short-term fixes that may create longer-term inefficiencies in building systems.

Soliciting feedback at the Small Midwest building also helped alleviate the threat to reputation that volunteered feedback sometimes represents. Some building operators may fear that requested complaints increase reputation threat by identifying problems and, by implication, shortcomings in their work. In reality, the dissatisfaction exists anyway, and persists and may fester if occupants are not given the opportunity to express it. This can be more damaging than an aired problem that is subsequently addressed. Thus, identifying problems via robust complaint handling systems can alleviate reputation threat-- rather than increase it-- in some cases.

This shift in thinking about identifying problems may be uncomfortable for some staff. Early in our study, in-house staff expressed some concern about new complaints being identified. Thermal comfort complaints were especially sensitive here since they caused the firing of one operations team. This concern largely disappeared however, as performance issues were addressed, and occupant satisfaction increased. At Small Midwest, complaint data allowed operations staff to make the case to in-house operations staff for more funding and equipment to make important operations changes, which in turn, could be used to solve the lingering problems that many knew existed. Therefore, as the number of solved problems increased, reputation threat decreased.

Volunteered complaint themes in Large West

Occupants in Large West reported being quite satisfied with their building (see table 1 above). When asked about their favorite features of the building, occupants cited the building's location near a river, access to parking and building amenities like the gym and cafeteria (Goins, 2012). Large West was also a high energy performer and achieved an EnergyStar rating above 90 in 2011.

Unlike Small Midwest, Large West had two complaint handling processes. Occupants could send a complaint to in-house operations staff who then forwarded it to the appropriate person. Occupants could also send an anonymous e-mail to a 'suggestion box' that was monitored by the company's chief executive officer (CEO). The CEO could then select and forward items to facilities staff if necessary. Conversations with operations staff suggest that the items collected via the suggestion box were many and varied. Many of the messages sent to this email address were not complaints at all. Still, many IEQ complaints were sent to this account rather than through the standard work order process, despite the fact that the complaints were anonymized and thus often lacked the locational details that would have helped in addressing the problem. According to in-house operations staff, the anonymity of the complaint process appeared to be very welcome to some users. Despite the common reputation for "occupants complaining all the time," many occupants may in fact be reluctant to complain, at least about certain conditions. Occupants largely used these formal methods to comment on or complain about the building, rather than more informal conversations with operations staff. In this building, outsourced operations staff did not have to interact with occupants regularly. In fact, the building was designed so that operators could traverse much of the building without encountering occupants.

The interviews that we conducted with facilities and building operations staff of this building suggested that formally volunteered complaints were gathered and sent to the correct person in many cases. On the other hand, how the complaint was utilized varied. Issues that were deemed addressable by in-house operations staff seem to be largely resolved, according to our interviews. For example, several occupants complained about foul smells near the elevator. Operations staff and occupant comments collected in the occupant satisfaction survey we conducted reported this problem having been addressed. There were also cold complaints in sections of the building. Operations staff was actively working on this issue during our study. Although not solved, action was being taken to try to fix the problem.

In contrast to temperature complaints, some issues seem to have been considered "unworthy" or otherwise inappropriate or unmanageable for further attention. The closed-ended requested survey responses in this building revealed many complaints about the ability to have a confidential conversation. During our interviews, facilities staff was explicit that this issue would *not* be addressed, since the most requested solution was higher cubicle walls, which – besides the expense and disruption, would have affected the lighting design and perhaps ran contrary to rationales of collaboration and employee visibility. The comments below suggest a similar issue: that of odors.

Exemplar comments:

> *There are way too many different perfumes and or colognes. I have allergies and asthma, management is just barely now addressing it after years of "complaining" in other words, bringing it to [their] attention. Staff, including management is very reluctant to listen/understand and accommodate.*

This comment and several other long and expressive comments suggested behavioral coping mechanisms (Heerwagen and Diamond, 1991) like occupants 'holding their breath' or avoiding areas of the building. Some of the comments discuss absenteeism related to odors from fragrances or sick building syndrome-like symptoms. The length of the comments, their style, capitalization and punctuation all express clear frustration with these conditions, but also with the perceived lack of response by building management.

We do not know if operations would have taken more steps like banning the wearing of fragrances or removing scented items from restrooms had more occupants complained; obviously, such policies would please some users while offending others, and enforcement of any sort of personnel rules would have been socially unwieldy. Still, the pattern seen here was also seen with other issues that were deemed unworthy or unsolvable for some reason. The operations team's reluctance to address the speech privacy concerns is one example of this kind of 'unworthy' problem. An IFMA facilities management survey (IFMA, 2003) reveals a variety of similar “dismissible” comments -- problems that may appear too individual, too trivial, or otherwise well beyond the scope of what a facilities department can or should do.

The organizational influence of Large West's operations team may have made it easier to ignore some complaints than it was for Small Midwest's staff to ignore them. Unlike most occupants, some in-house operations staff in Large West held executive level positions with a direct line of communication to the CEO. Therefore, while operators mentioned reputation threat from complaints in passing here, it was certainly not the driver that it was in Small Midwest.

Large West's complaint handling system functioned largely like the working model introduced above (figure 1). Ultimately, the operations team at Large West appeared to be largely successful at complaint acquisition and transmission. On occasion however, there were problems with utilizing information embedded in the complaint. Their process did not always permit using the information in complaints to improve service or offer redress, even in cases of what seem to be severe discomfort as in the cases of fragrances and speech privacy.

Summary

As was suggested in the methods section, this analysis permitted an examination of the performance problems themselves, promoted an understanding of the operators’ sense of the problem, and described how the complaint handling process did or did not support solving this problem. For example, we learned that Small Midwest did not have a formal complaint handling process. The practical implications of this are that opportunities to educate or engage occupants were often missed, while problems –especially related to temperature-- often remained unresolved. In contrast, when complaints were gathered via a survey, outsourced operations staff found them valuable and were eager to use these complaints to improve building conditions. These requested complaints served an organizational purpose as well, to help make the case that action was needed. They also helped alleviate reputation threat. This shift in thinking toward actively identifying problems may be uncomfortable for some staff, but this discomfort may disappear as performance problems are fixed. Of course, the latter depends on adequate staff, funding, and organizational buy-in, which do not necessarily materialize when problems are identified.

In contrast, Large West had a formal complaint handling process; and, complaints were both volunteered and requested. The problem at Large West's was that their process did not always succeed at moving from complaint to solution; and certain classes of complaints remained unsolved. While complaints were gathered and forwarded to the correct staff person, if the complaint was deemed unsolvable, as were some occupants' air quality concerns, their process did not permit using the information in complaints to improve service or improve the building. Instead, the problem lingered. Not all problems can necessarily be addressed with reasonable cost; however, the process might still have allowed for alleviation or assuagement in other ways, if only through acknowledgement of the problem.

In talking to building operators and facilities managers, we were impressed by how central occupant complaints seemed to be for operator, occupant, and management decisions. The importance, of course, depends on the building and conditions in that building. In newer, LEED-rated office buildings, like those presented here, occupant complaints may have much influence on building operations, while in other cases they may have less. No matter whether occupant complaints in any building currently influence operations or not however, there is still likely much valuable information embedded in them.

Conclusion

Research on complaint acquisition and handling in retail and service organizations has provided a useful entrée to understanding complaints in office buildings and in particular for thinking about improving operational linkages between occupants and building systems or IEQ issues. If used in a similar way to that described in this literature, occupant complaints potentially contribute to a type of ongoing commissioning, one that includes the perspective of occupants more fully.

Identifying, evaluating, and using the information conveyed in complaints requires regular review of complaint logs or databases. Here, we integrated both quantitative and qualitative complaint data to provide breadth and depth to the discussion of occupant-centered building performance. The results were presented as percentages of requested complaints and thematically arranged volunteered complaints. It is a powerful, yet simple kind of analysis within the reach of the facilities teams at both our case buildings, and likely many others. At the same time, building operator training programs could teach analysis techniques like those described in this paper. In this way, operators could mine the information for themselves.

Our research underscores the need for more researcher, designer, and building management attention to the potential value of using occupant complaints as a tool for diagnosing what goes wrong in buildings, from the occupants' points of view. Better compilation, analysis, and diagnosis of these complaints also helps provide a potential route to address occupant concerns more effectively than the short-term, reactive, stance that is common practice. Analysis is only possible however, if complaints are gathered, routed and if solutions are explored and implemented based on the information discovered. In short, complaint handling processes must include gathering, routing and utilization, as suggested by Homburg and Fürst (2007).

Complaint handling processes must also acknowledge the social context of complaints. As we saw in our two case buildings, the social dynamics within an organization sometimes derail the process and stop discovery about how occupants experience the building and what can be done to address problems. At the same time, we also found that actually seeking out complaints, through soliciting them in an occupant survey, can help alleviate the reputation threat that occupant complaints seem to pose.

Our case study examples suggest that the organizational tendency for complaint suppression cited in the literature on retail and service organizations may often apply to the building realm as well. Our results, though centered on only two case studies, also suggest that implementing a complete complaint handling process, including analysis, can help reduce the tendency to suppress complaints and to lead organizations to more fully incorporate occupant feedback into operations. More research on how occupant complaint handling works – especially interdisciplinary research that combines attention to social dynamics as well as technical and design responses -- and how this complaint handling might work better, potentially provides valuable information in getting buildings to work better for their occupants.

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[i] EQuest Software (http://www.equestsoftware.com/equest-features/)

[ii] Whereas Homburg and Furst were concerned with whether complaints were gathered or not, in this study we always gathered complaints via surveys and were thus more concerned later steps in the complaint handling process. Still, we asked staff about their complaint gathering processes before the study, but could not observe their actual effectiveness.

[iii] Both case buildings outsource a number of operations functions.

[iv] A demo of the survey given to facilities managers can be found at: www.cbesurvey.org/cbesurvey/operations.htm.

[v] Not all participants responded to every question, so we report the number of observations for each table or chart.

[vi] Although there were many themes introduced in these data streams, the scope of this paper requires focusing on complaints related to energy use, building system performance and IEQ. Other issues like commuting, recycling or water use are outside our scope.

[vii] It should be noted that both of the case study buildings are newer, which may also affect occupants' satisfaction. New things are simply more novel than old ones. At the same time, this too highlights the value of this kind of analysis. It suggests how much of what sort of attention is needed for the building in question, just the kind of information building operators need to manage operational linkages in a dynamic and holistic way.

[viii] We focus on temperature here for illustrative purposes. Other IEQ factors like air quality and lighting could also be analyzed for additional detail.