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and Eva Klein

QUALITATIVE FACILI

BEYOND THE CONDITION AUDIT

TIES ASSESSMENT

Toward a More Comprehensive View of Facilities Quality

In APPA's recently published book, *Strategic Capital Development: The New Model for Campus Investment*, the authors make a case for substantial change in capital planning for higher education institutions. The new model posed is intended to urge institutions and systems to 1) identify more systematically all capital needs of all types; 2) integrate quantitative space needs with qualitative facility assessment to define whole-building solutions; 3) prioritize projects, based on planning principles, while minimizing the influence of politics; 4) associate the needs/projects with financing sources in a comprehensive long-range capital investment plan; and 5) via all the above, ensure that perpetually scarce capital resources are applied as productively as possible.

This article, drawn from the book, focuses on one very important element of capital needs assessment and planning — comprehensive qualitative assessment of existing facilities — as part of the still more comprehensive four-part needs assessment model that includes:

- Space Capacity
- Facilities Quality
- Special Facilities
- Infrastructure, Campus Environment, and Sustainability

These four needs assessments, in turn, are embedded in the comprehensive planning model shown in Figure 1.

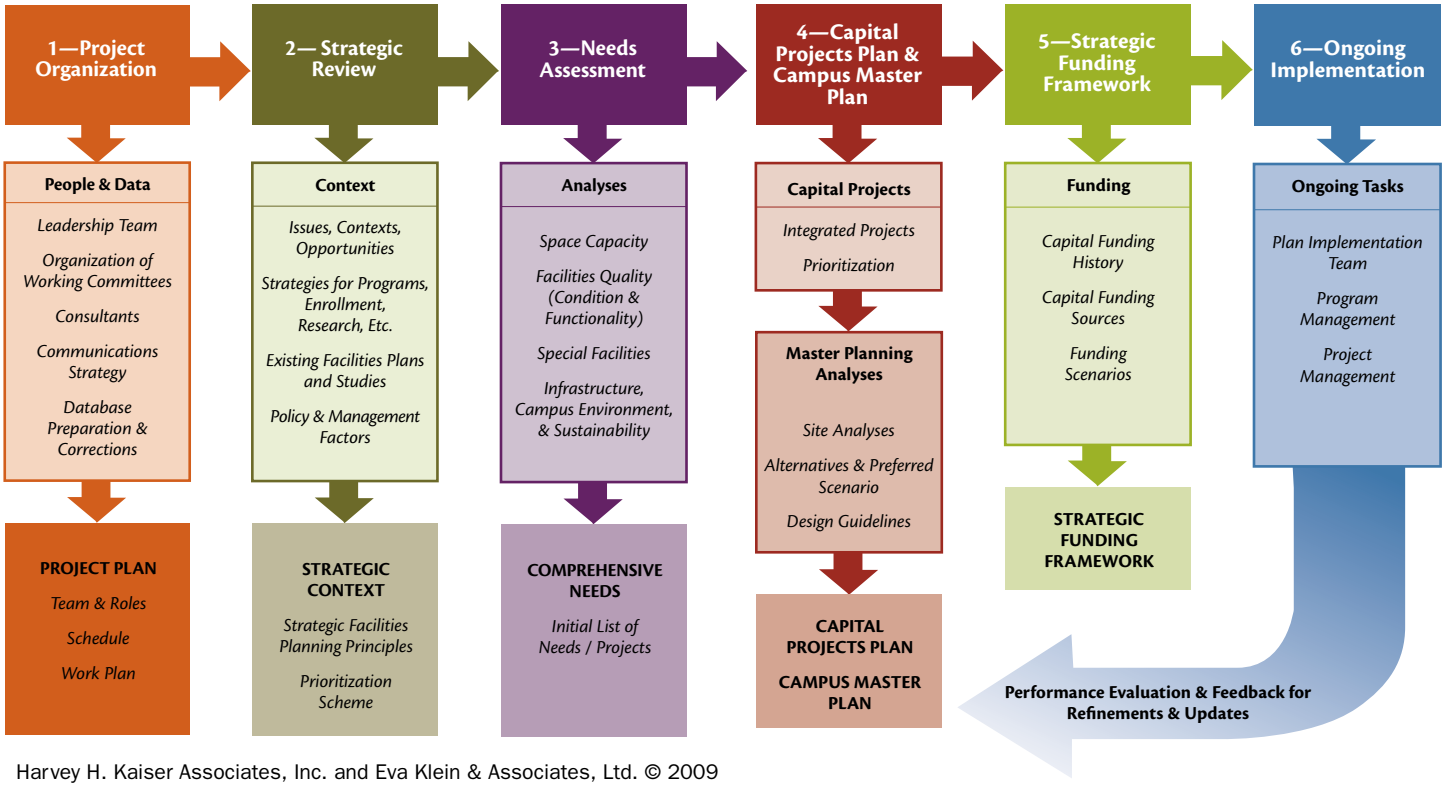
METHODOLOGY OVERVIEW

Facilities Quality is defined in this model as the combination of condition, functionality, adequacy, and modernity/obsolescence factors that make a building both 1) of sound physical condition, and 2) appropriate or suitable as space to support program functions for which the space is intended. With this definition, the *Facilities Quality Assessment* (FQA) is defined as an assessment methodology that combines and integrates the findings of the more familiar *Facilities Condition Audit* or *Assessment* (FCA) with the findings from a new methodology, the *Facility Functionality Assessment* (FFA).

In the now-familiar *FCA*, engineering experts identify physical deficiencies of building systems and subsystems, as well as deficiencies with respect to compliance with applicable codes and conformance with the American Disabilities Act (ADA). The FCA can be a fully detailed *audit* or a *statistical forecast* based on life-cycle expectations, or a combination of the two. Although many features of the building that may affect users (lighting, finishes, safety, etc.) are evaluated as building systems, nothing about the methodology directly addresses the question of how well the space functions programmatically.

In contrast, the FFA is not an engineering-oriented exercise. It must be performed by evaluators with knowledge of programs and pedagogy (rather than building systems). The FFA captures elements of qualitative deficiency from the program/facility users' point of view that a condition audit cannot capture.

Figure 1 Strategic Capital Development: A Comprehensive Model



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CONDITION—THE CONDITION AUDIT AND/OR LIFE-CYCLE FORECASTING

Condition Audit

An FCA answers this question: *What will it take to bring the building or infrastructure back to its original condition and to meet current codes?* The audit reveals observed conditions and permits formation of remedial projects to correct deficiencies—ranging from deferred maintenance backlog to projected future renewal needs.

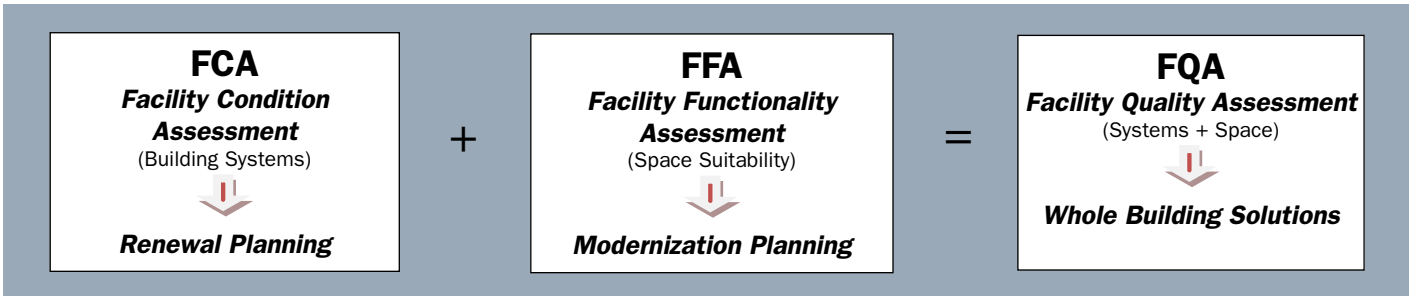
The FCA data sources include field inspections of buildings and infrastructure; observations from maintenance staff and records; building and infrastructure feasibility studies; and review of proposed capital projects that incorporate condition deficiency remedial work. The methodology provides a database of systematically collected information, including findings from inspections and other sources, preliminary prioritization of remedial work, graphics, building images, and estimated costs.

Ideally, to remain optimally useful, the FCA must be updated periodically. Although all facilities can be included, the FCA can be omitted for buildings in temporary use; buildings below a size threshold; or non-essential campus structures. Unique facilities with special structural systems or a high level of public use, such as arenas, performing arts complexes, or convocation centers, may warrant inspections at more frequent intervals.

Life-Cycle Forecasting

Forecasting of capital renewal needs is based on building system life cycles and remaining useful life of building and infrastructure subsystems (such as mechanical, plumbing, electrical, elevators, roofs, and so forth). The forecast produces a calculation of the scheduled year for system renewal and estimated renewal cost. Calculations of costs to restore various systems when life cycles expire are totaled on an annual basis and can

Figure 2: An Integrated Facilities Quality Assessment Model



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be averaged over a period of time to calculate an annual capital renewal expenditure allowance.

Combination

The two methodologies—detailed FCA and predictive life-cycle modeling—vary widely in cost and in how the results are used. In 2010, the statistical life-cycle modeling technique is likely to cost less than 20 percent of the cost of performing full field inspection condition audits. In addition, life-cycle modeling requires less time to produce findings. Both techniques depend on in-house staff input in varying degrees. The inspection-based audit provides the advantage of more detailed information—and is thus more useful to develop budgets for actual implementation of projects, but these data also have a "shelf life." The predictive modeling approach provides less detail and does not fully incorporate actual observed conditions, but it can be useful for broader capital renewal planning purposes.

The authors recommend that institutions consider a combination in which life-cycle forecasting is applied to the entire facilities portfolio and, in addition, detailed field inspections are done for a subset of buildings and infrastructure that are considered either most critical or most at-risk, or both. This combined approach achieves a balance between details and costs; delivery of findings on a timely basis; effective use of in-house staff time; knowledge of plant conditions; and data updating requirements. It provides sufficient data for long-range planning and details for a subset of buildings.

FUNCTIONALITY—THE FACILITIES FUNCTIONALITY ASSESSMENT

Although references to a comprehensive approach combining physical condition and functionality have appeared in the facilities literature, application of the functionality concept has been by far the exception, rather than the rule. As the authors have developed it, the *FFA* methodology is intended to answer the question: *How well does the existing space meet contemporary functionality needs for the program (programs) it is supposed to serve?*

The *FFA* takes into account factors of program requirements. For this reason, and in complete contrast with the FCA, this assessment is done *by space type* (e.g., classrooms, teaching laboratories, research laboratories, offices, and the like), rather than by building systems. It is based on 1) field evaluations of buildings against a set of pre-established *Facility Quality Criteria* that express the desired qualitative and functional performance features of space, and 2) information about functionality and program needs from *user* interviews.

The assessment team does not require engineering/architecture backgrounds but does require knowledge of pedagogy; state-of-the-art space configurations; equipment for specific programmatic needs; and other use-driven technical space requirements. The assessment team also needs to have the experience base to formulate interview questions and then to interpret comments of interviewees correctly.

The scope of an *FFA is* tailored to the specific size and complexity of an institution. Generally, all major buildings serving instruction, research, service, and student/campus life programs are included. Typical exclusions are new buildings (e.g., ten years old or newer); recently renovated/modernized buildings; and minor structures.

Facility Quality Criteria

Facility Quality Criteria are a baseline set of qualitative characteristics that, together, make a space suitable to the conduct of a particular program. Criteria for space configuration, finishes, equipment, and mechanical, electrical, lighting, communications, and other unique requirements are specific to each major space type.

Field Evaluations of Buildings

After the *Facility Quality Criteria* are developed and adopted, then, an evaluation format must be created, for use in the building inspections. The building evaluations (walk-throughs) are conducted and extensive notes are made and edited.

User Interviews

User interviews generally are conducted with groups of users that may be organized by schools, groups of departments, a single building, or a group of related buildings. The initial selection of user groups is itself an important part of the methodology, as the interviews need to generate information that is balanced between being too general and too specific.

The interviews then must be structured by a well-crafted interview protocol and conducted by personnel with interview experience. Any time that college or university users are interviewed on the topic of facilities, it is likely that the comments received will include a broad range of responses—from thoughtful expressions about real needs to "wish-list" items. In this case, the point is to learn about actual *qualitative deficiencies and needs*, rather than "*we need more space*."

Four Tools Required for the Facilities Functionality Assessment:

- Facility Quality Criteria
- Evaluation format for building inspections
- User interview protocols and methods
- Cost template

Project Definition and Cost Template

Upon completion of the user group interviews and the building inspections, using the *Criteria*, the analysis involves defining what qualitative improvements are required to bring the buildings to the equivalent of "modern," and the cost template is applied. Now these findings are ready to be integrated with the condition audit findings.

BRINGING TOGETHER CONDITION AND FUNCTIONALITY

An FCA (audit or forecast or combination) and an FFA

provide two counterpart views of capital improvement needs for each building evaluated—but there will be some overlap and need for integration. In some cases, the costs identified by the FCA and FFA findings can be added together. For example, for Building X, the FCA yields $2 million of building system and code corrections—including a new roof; exterior painting, HVAC system upgrades, and so forth. For Building X, the FFA review yields another $2 million of interior space reconfiguration, for example, to change the sizes and configurations of classrooms or to make a suite of offices smaller but better organized. In this example, total project need is stated at $4 million ($2 million in condition deficiencies plus $2 million in functionality deficiencies).

In other cases, the findings of the *FFA* may trump *FCA* findings. For example, in Building Y, a *Condition Audit* may find that some light fixtures in classrooms are broken and require replacement. The *FFA*, however, may conclude that the entire lighting system is inappropriate for modern instruction and will yield a cost for complete replacement of the lighting system. In such an event, the deficiency cost of replacement of some broken fixtures would be replaced by the cost of an entire new lighting system.

SPECIAL STUDIES

Discussion of *Facilities Quality* is not complete without mention of special sub-studies that may be required in connection with the *FCA* and *FFA*. For example, although review of ADA compliance typically is included in today's FCAs, it is not unheard of for an institution to need a special ADA assessment. Similarly, many campuses have historic buildings—both on historic registers and not. Assessment of historic buildings usually requires special expertise, beyond the scope of a typical FCA. Safety and security, likewise, may require special evaluation and new solutions (not all of which are facilities solutions). And, finally, it is often useful to conduct a specific study of energy use and sustainability—to make plans that involve a range of "green" solutions--from energy generation changes to facility energy features to policy and behavioral elements.

A NEW METRIC—THE FACILITY QUALITY INDEX

The universally accepted measure of facility condition has been the *Facility Condition Index* (FCI), defined as the estimated cost to correct condition and code compliance deficiencies, divided by the current replacement value (CRV) of the building.

$$\text{FQI} = \frac{\$ \text{ to Correct Condition and Code Deficiencies} + \$ \text{ to Achieve Functionality Improvements}}{\$ \text{ Current Replacement Value}}$$

With about three decades of FCA experience, consultants have established comparative data and ranges to define the severity of needs. Building on the concept of the FCI, a new metric, intended to capture both condition and functionality needs, is the *Facilities Quality Index*, or FQI—which provides a metric of the relative severity of qualitative building needs.

The higher the FQI, the more extensive the condition and obsolescence deficiencies defined as the capital need, and the more urgent the need to modernize the building. Based on their experience, the authors propose interpretive ranges as shown in Figure 3—Ranges for Facility Quality Index.

Due to the combination of estimated costs to correct condition and code deficiencies and estimated costs of functionality-driven programmatic improvements—often resulting in a comprehensive building renovation or modernization project cost—calculated FQIs always will be higher than calculated

Figure 3 Ranges for Facility Quality index

Level of Need	FQI Range	Description
A	0.00 - 0.05 (0% to 5%)	Requires continued normal maintenance and attention to life-cycle systems renewal
B	0.06 - 0.29 (6% to 29%)	Limited to Moderate Renovation, including correction of some condition deficiencies
C	0.30 - 0.49 (30% to 49%)	Moderate to Extensive Renovation, combining functional changes and correction of moderate condition deficiencies
D	0.50 - 0.99 (50% to 99%)	Comprehensive Modernization, combining extensive functional changes and/or correction of extensive condition deficiencies
E	≥ 1.00 (100% or greater)	Candidate for Demolition (or Demolition and Replacement), or Comprehensive Modernization which may include downgrade to less demanding use

FCIs. In fact, for any given building, the FQI can exceed 1.0—meaning that the cost to make the building "right," from both condition and functionality perspectives (overall building quality) may exceed the building's CRV. This provides an interesting new view of options. An FQI of 1.0 or greater indicates that it is uneconomic to renovate the facility, at least for its current use; other alternatives, such as demolition, replacement, and use conversion, should be explored. (A building of historic or sentimental value to a campus, even if its FQI exceeds 1.0, would not be a candidate for demolition.)

IMPLICATIONS FOR NEW DIRECTIONS IN CAPITAL PLANNING

The outcome of an FQA is a series of whole-building capital projects, each with described condition and functionality deficiencies to be corrected, and with an order-of-magnitude cost. Each building also will have a calculated *FQI* that provides input to prioritization decisions.

Importantly, the FQA findings have another critical use. They can be integrated with the results of a *Space Capacity Analysis* that has defined current or projected surpluses or deficits of space, by space type. Using Capacity and FQA findings together, modernization plans for buildings can incorporate changes that aid in "rightsizing" of instructional, office, research, and support spaces.

The FQA (especially when used with Capacity findings) is a better tool for defining major projects for long-range, strategic capital planning (as opposed to annual renewal management), because it leads to a broader set of decision options:

- Condition deficiency remedial (system renewal or replacement) projects
- A range of moderate to full renovation and modernization projects that variously include correction of system condition deficiencies; functionality improvements; space reconfiguration; or even entire change of use
- New/replacement building and downgrade of the existing building to a less demanding use (e.g., a new science lab building and conversion of the old science building to another use)
- Demolition or disposal.

Thus, the comprehensive *Facility Quality Assessment* is a methodology that is intended to support governing boards, presidents/chancellors and chief academic officers in strategic capital planning—in addition to supporting chief facilities and financial officers in capital renewal budgeting.

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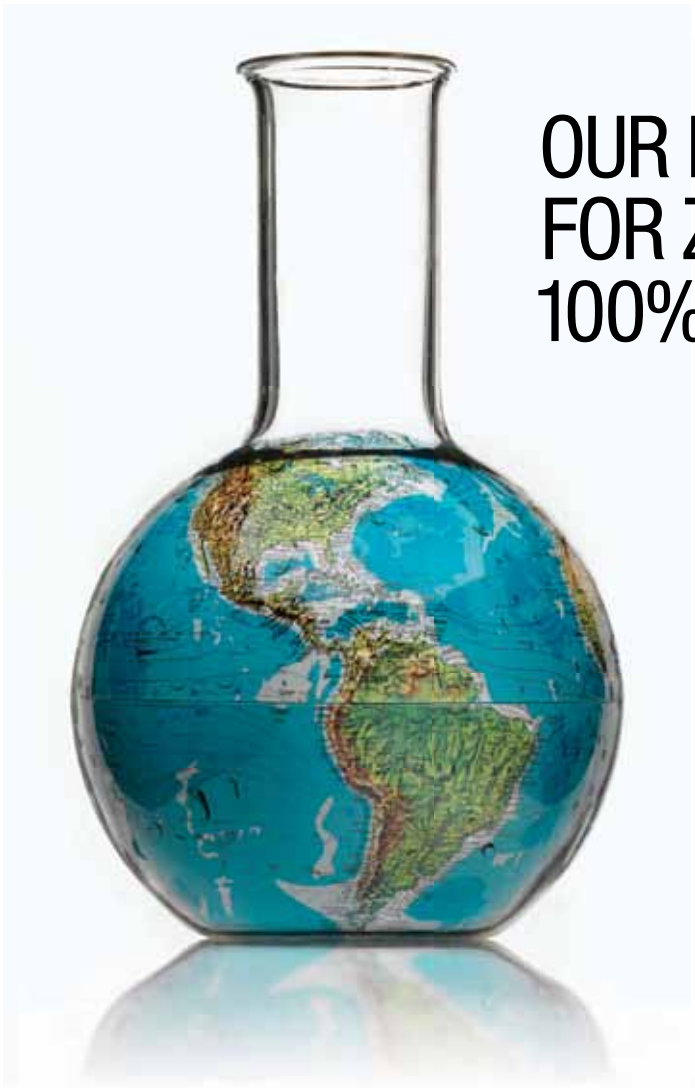

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