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HISTORIC HOUSE MUSEUMS AND THEIR CHANGE OF USE: SEARCHING FOR BALANCED BUILDING PERFORMANCE: A CASE STUDY IN SÃO PAULO, BRAZIL

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RESUMO

As particularidades de uma casa-museu apresentam diversos desafios na conservação da edificação e seu entorno. Este artigo tem como objetivo apresentar possíveis métodos a serem adotados pelos gestores e equipes para o monitoramento do seu desempenho físico com práticas adequadas a essa tipologia. Foi elaborado um estudo exploratório contemplando a aplicação de multimétodos da avaliação pós-ocupação (APO) em um caso de estudo, a casa-museu Ema Klabin em São Paulo, Brasil. Esta abordagem inclui verificações sobre aspectos qualiquantitativos dos ambientes para avaliação do desempenho da casa-museu e do contexto em que se insere, incluindo os pontos de vista dos pesquisadores/avaliadores, de outros especialistas e de seus usuários regulares. O desenvolvimento de quadros e mapas sínteses de diagnósticos e de recomendações demonstram os resultados da aplicação desses métodos. Estes são decorrentes do cruzamento de levantamentos técnicos e da visão de especialistas com a percepção e a satisfação dos demais usuários e propiciam insumos aos gestores para as tomadas de decisão e formulação de possíveis diretrizes relativas a futuros projetos com características de uso semelhantes.

Palavras-chave: Casas-museus. Museus. Avaliação pós-ocupação (APO). Desempenho físico.

ABSTRACT

A house museum has its own particularities, presenting many challenges in terms of conservation of the building itself and its surroundings. This article aims to present integrative methods that can be adopted by museum managers and teams to monitor the building performance of a historic house museum. An exploratory study was carried out using Post-Occupancy Evaluation (POE), a multi-methods non-invasive application, at the Ema Klabin historic house museum in São Paulo, Brazil. This approach analyses qualitative and quantitative aspects of the environments to evaluate their performance and the context in which they operate, including the point of view aired by researchers/evaluators, other experts, and regular users. Summary charts and maps regarding diagnosis and recommendations were developed to demonstrate the results achieved with these methods. They are the result of cross-sectional surveys, providing input to aid decision making and developing possible guidelines for future projects with similar characteristics.

Keywords: Historic house museums. Museums. Post-occupancy Evaluation(POE). Building performance.

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INTRODUCTION

The importance of preserving collections has been widely debated in recent decades and this discussion is one of the most important ways to promote and legitimise libraries, archives, and museums (SCHULLER-ZWIERLEIN, 2015). However, the importance and peculiarities of conserving collections contained in historic house museums, especially in in the southern hemisphere and in tropical and subtropical climate zones, is a recent field of study to be expanded.

Post-Occupancy Evaluation (POE) applied in museum environments can help us to understand the possibilities of preserving collections, not only the building itself, but also the historical collections that it houses, its gardens and its urban surroundings, while also considering particular user demands (visitors and staff). There are studies addressing their applications in refurbished or restored historic public buildings, either to maintain the planned functions (HASHIM; AKSAH; SAID, 2012) or to house a specific collection, such as is the case of the Immigration Museum (*Museu da Imigração*) (LOPES; ORNSTEIN, 2018), located in the city of São Paulo, Brazil.

A multi-method focused on applied research, POE is considered relevant for diagnostics throughout a building´s useful life and on its technical-functional performance (ROBERTS et al., 2019).

The aim of this research (CANSADO, 2021) is to discuss the procedures and protocols for monitoring the internal and outdoors environments of the particular typology of historic house museums using the *Ema Klabin* Foundation (FEK in Portuguese) as a case study, where the authors applied the POE mainly to evaluate the construction system, environmental conditions, functionality, accessibility, gardens and their collections, as well as the urban surroundings.

Case Study: Ema Klabin Foundation

The *Ema Klabin* historic house museum is located in a high-income neighbourhood in the city of São Paulo, Brazil, called *Jardim Europa*. Designed and built in the early twentieth century, Jardim Europa incorporated many proposals from its neighbourhood close by called *Jardim América*, a real estate development from the City of São Paulo Improvements and *Freehold Company Limited*, or simply Cia. City (COSTA, 2017). The neighbourhood project proposed returning to a way of life related to nature, a suburb, that was, at the time, away from the city, and which, through urban forestry, large plots, and other landscape elements, sought to have this association with natural environments.

Even after the urban transformations, the neighbourhood maintained its original urban design and was considered a municipal and state heritage.

In 1937, Ema Klabin acquired the land in *Jardim Europa*, where she built her house, commissioning architectural designs from four different architects over the next seventeen years. This delay in finishing the final architectural design was because the owner wanted to build a house that stood out in the neighbourhood, highlighting her personality, and housing her art collection (COSTA, 2014).

The timeline (Figure 1) below shows the milestones in the life of the owner and the process of design, construction, and uses of this historic house museum.

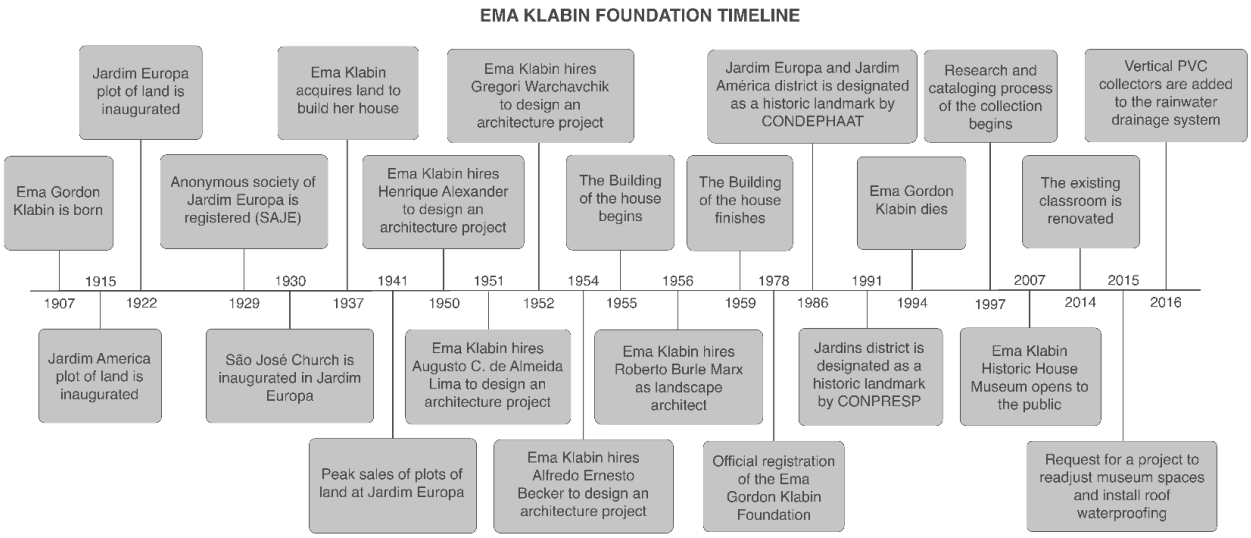

Figure 1: FEK Timeline.
Source: Elaborated by the authors.

The final design was drawn up by Alfredo Ernesto Becker[1] and the house was built on shallow basements supported on firm ground which, due to its relief, allowed the construction of a basement without needing to move large amounts of soil. The structure of the house is made from reinforced concrete and solid brick masonry walls: there are external double brick walls up to 65 centimetres thick, whose thickness accommodates windows and sliding doors. The roof structure is predominantly made from wooden trusses, covered with French clay tiles and a copper dome roof above the water tank (COSTA, 2014), it also has no ceiling plaster, its finishing consists of painted concrete slabs. The floor area in the house used to have its own heating system (non-operational since it became a museum), as well as boilers in an external area to increase the temperature of the floor in the house. This area currently houses the museum's classroom.

The form the house acquired in the final design consisted of distributing the rooms around 'a large semicircle gallery' (COSTA, 2017), shown in Figure 2 below, connecting the different environments of the building.

Figure 2: The semicircle gallery. Note all different environments of the house that are accessible through the gallery.
Source: Cansado (2021).

Regarding the external aspects of this project, landscape architect Roberto Burle Marx[2] was hired to develop the landscape design of the external area, however, he did not complete the garden design. Even after he put forward different studies, it can be inferred that

[1] Alfredo Ernesto Becker was an architect from São Paulo, author of many residential projects in the 1930s and 1940s. He has at least 24 architectural and construction projects in Jardim América and other regions in the city of São Paulo (WOLFF, 2016).

[2] Roberto Burle Marx (1909-1994), a renowned Brazilian landscape architect and fine artist, internationally recognised.

both the final design of the garden and the internal patio were defined by Ema (the owner), Becker (the architect) and Lottieri Lotteringhi Della Stuffa (the decorator)[3] (COSTA, 2017). In addition to the changes in Burle Marx's landscape design promoted by Klabin, Becker and Della Stuffa, the garden, as it is a living being (DELFIM; SECKLER, 1999), underwent natural changes over the years until it became what it is today.

After Ema Klabin passed away in 1994, the house was officially opened to the public in 2007 and it has not changed its internal layout since its opening.

The house, transformed into a historic house museum, presents different levels only accessible through indoor stairs, and some narrow spaces, which implies, for example, some limitations for people in wheelchairs. The change of use has also led to some characteristics that were suitable for a house – such as large windows that allow ample sunlight – to become inappropriate for its new use as a museum, as these aspects can damage the collection, considering the tropical climate condition.

Poe Methodological Procedures

In order to accomplish the POE objectives, instruments were developed to evaluate the building performance and user environmental perception (visitors and staff). Due to COVID-19, many of the original methodological procedures were adapted for online platforms. Some authors highlight that mandatory digitalization of various research procedures at the beginning of 2020 served as an opportunity to review usual practices (TRAMONTANO et al., 2020), which was the case in this particular study.

The activities carried out to develop the research, after careful consideration and adaptations, are illustrated in Figure 3 below.

One of the activities was to develop instruments to assess the physical aspects of the built environment, as well as user environmental perception: interviews, questionnaires, wish poems and internal and external checklists to support walkthroughs were carried out. All materials underwent an ethics review, having been submitted and approved by the Ethics and Research Committee (ERC) at the School of Arts, Sciences and Humanities at the University of São Paulo (EACH USP in Portuguese) under number CAAE 25040719.1.0000.5390 in November 2019.

The initial proposal would be to evaluate user environmental perception through questionnaires, wish poems and interviews after visiting the historic house museum in situ. Interviews with staff were conducted

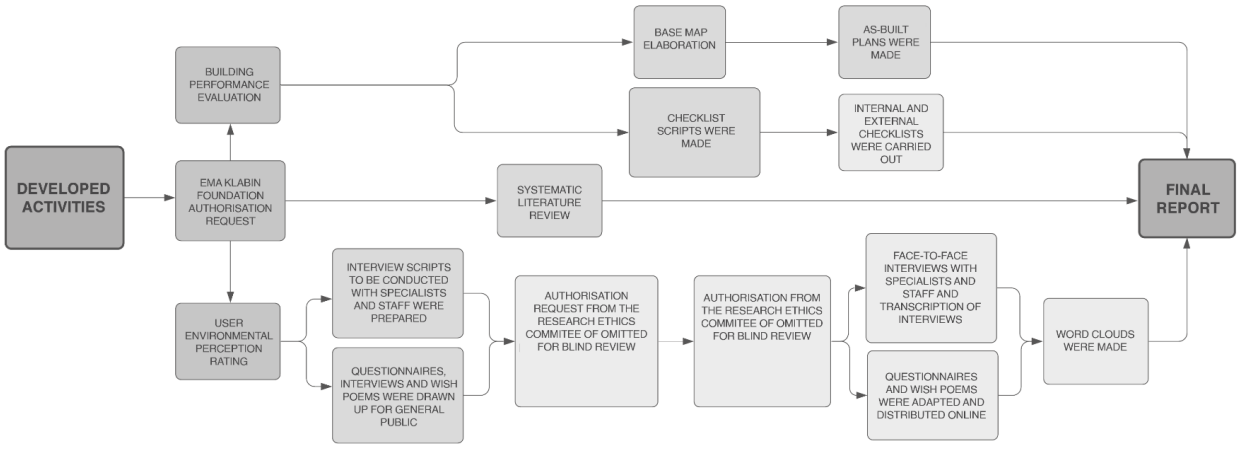

Figure 3: Activities developed in the research.
Source: elaborated by the authors.

[3] Lottieri Lotteringhi dela Stuffa (1919-1982) Italian decorator who migrated to Brazil in the 1950s, settling in Rio de Janeiro. (COSTA, 2017).

in a pre-pandemic/social isolation period, however, due to the circumstances related to COVID-19 and the quarantine/closure of the Institution, some of these instruments had to be adjusted. For example, the questionnaire and wish poem were distributed online. The museum director (who holds a degree in Architecture and Urbanism) helped to post the questionnaire and the wish poems on social media, aiming to reach adult respondents only. The museum team also helped to fill in the checklists and provided other technical information. These adjustments allowed data collection, analysis, and presentation of results, without changing the original objectives of the research.

These limitations implied the need to adapt the questionnaire and the wish poem to the online mode, so that it was possible to fulfil the research objectives and within the stipulated period. Figure 4 below illustrates the process of applying these procedures, from preparing them to disseminating them to the public through digital media. Social media and technology have been employed to fund programmes and transform education in museums since the start of the last decade by other institutions with similar characteristics to the current case study, such as The Benaki Museum (CHRISTIDOU, 2014), and also in other museum typologies, such as The Museum of the Portuguese Language and The Football Museum (LUPO, 2017), notorious Brazilian examples.

This role has intensified during what specialists have called a 'highly digitized pandemic' (PRADO, 2020). The FEK historic house museum increased its online presence to fit in this context, increasing social media posts and newsletters sent to the public, engaging with its visitors as much as possible: promoting online lectures (FEK, 2022) and raising funds in online campaigns to digitalize the museum's collection (FEK, 2021), taking even further the foundation's online presence.

Among the instruments developed, only the following were applied due to the limitations faced during the period (see Table 1 below).

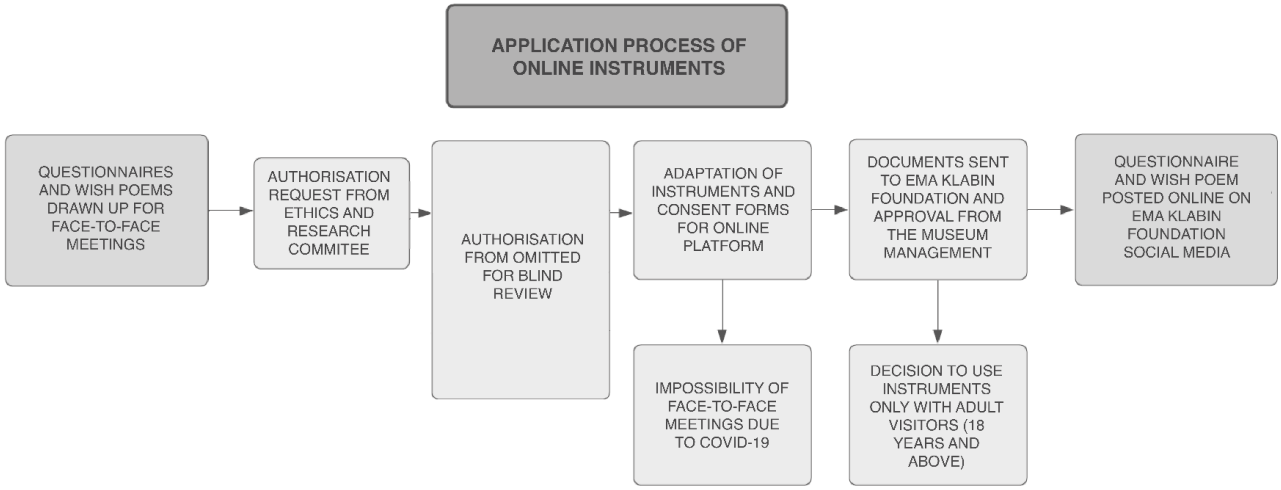

Figure 4: Application process of online instruments.
Source: elaborated by the authors.

Instruments carried out with general public	Instrument carried out with staff members	Consent forms	Building performance
Questionnaire script	**Interview with specialist**	Individual consentment form – individual interview	External accessibility checklist and walkthrough
Wish poem script	**Interview with collection and research representative**	Individual consentment form – group interview	Internal accessibility checklist and walkthrough
–	**Interview with administrative representative**	Individual consentment form – questionnaire and wish poems for adults	Building performance checklist and walkthrough
–	**Interview with visual arts representative**	–	Fire and safety checklist and walkthrough
–	**Interview with communications representative**	–	–
–	**Interview with curator representative**	–	–
–	**Interview with courses and presentations representative**	–	–
–	**Group interview with educational representatives**	–	–
–	**Group interview with events representatives**	–	—
–	**Group interview with reception representatives**	–	–
–	**Group interview with support representatives**	–	–

Table 1 – Instruments applied.
Source: elaborated by the authors

Another important point to be highlighted is the decision to use the instruments remotely only for people over 18 (adults). This decision was made, in this online format, as there was no way to ensure that adults responsible for minors would authorize filling in the proposed form for children/adolescents (minors) via the 'Informed Consent Form' (ICF) and that the minors would, in turn, fill out the 'Assent Form' (AF), as is the procedure in Brazil.

To exemplify the contents of some of the instruments developed, we will present the structure of the questionnaire and checklists in further detail.

Online Questionnaire

The questionnaire was divided into seven sections, as follows:

1) Prerequisites for answering
This block was constituted by elimination questions such as age, the last visit to FEK historic house and agreement to the proposed ICF. In other words, when the user stated their age on the online form, if they chose the option 'I am 17 years old or below', the questionnaire was automatically closed. The same happened if the user had not been to the FEK historic house in the last two years (a period in which a person would be able to remember the visit vividly) and if they did not consent to the ICF presented.

2) Visitor's profile
The questions in this segment aimed to build the visitor's profile, such as age, gender, location, and transport used to arrive at the museum.

From this section on, the visitor was presented with the description of a particular place of the historic house museum and had to attribute a mark to a rating scale, that ranged from 0 to 4 (0 – N.A. / 1 – Very Bad / 2 – Bad / 3 – Good / 4 – Very Good).

3) Perception of access
In this section, we evaluated the visitor's perception of the museum's ease of access, and condition of its urban neighbourhood.

4) Perception of external areas/ appearance
The visitor's perception of the historic house museum's gardens and external areas, including visual aspects and thermal comfort were evaluated in this segment.

5) Perception of support areas
This category evaluates the general opinion of the museum's facilities, such as restrooms, reception, and classroom.

6) Perception of exhibition areas
Perception of the internal areas of the museum, the exhibition, the artwork description, and overall comfort.

7) Reopening protocols
A section destined for collecting information and suggestions about reopening protocols that could be adopted by the museum after the quarantine period.

Results from the online questionnaire

One hundred and forty-eight participants took part in this research (as approved by the ERC). Moreover, one hundred and twenty-three people completely answered the questionnaire in August 2020. Table 2 shows the complete answers obtained and considered in the questionnaire.

TOTAL NUMBER OF RESPONSES	COMPLETE RESPONSES
148	123

Table 2 – Questionnaire's Results.
Source: elaborated by the authors.

Figure 5 shows some examples of charts obtained from the visitors' answers.

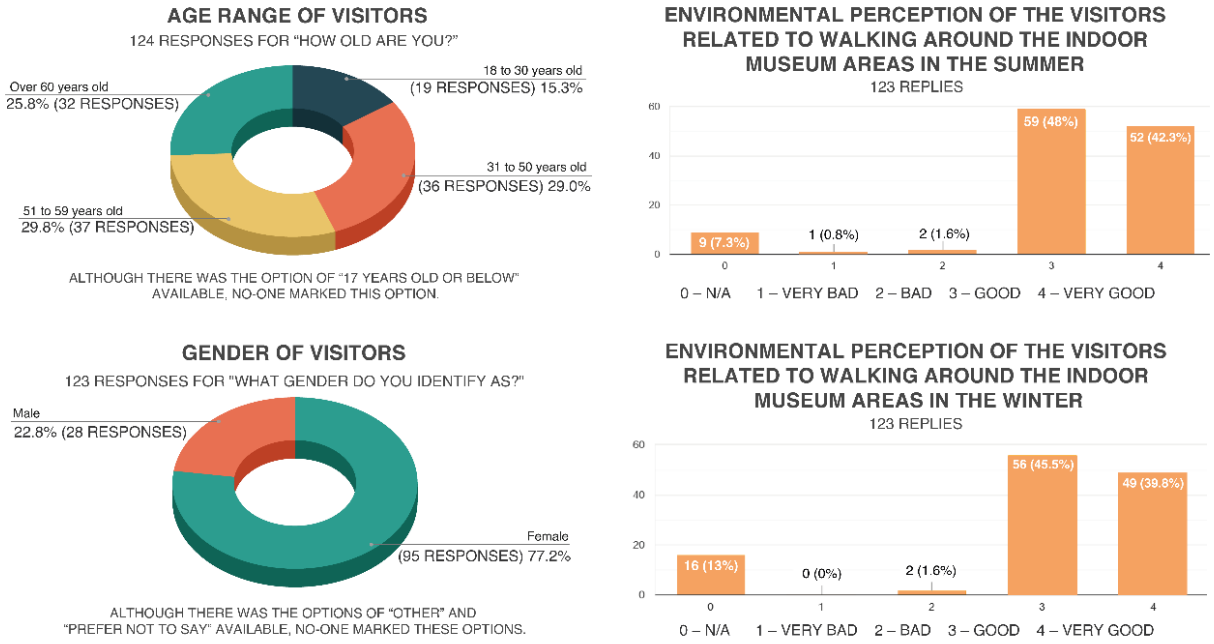

Figure 5: Example of results obtained through the online questionnaire. Source: elaborated by the authors.

This segment of the research was carried out from a sample of FEK visitors who follow the institution on social networks or subscribe to the museum's newsletter. Therefore, these results were compared with those referring to the other instruments (see Figure 3) so that the analysis on the performance of the building, gardens and surroundings were more reliable.

In the charts above, the number of responses changes from the 'Age Range of Visitors' to the other sections of the questionnaire due to this question being in the 'Prerequisites' section, meaning one person did not get to answer the full questionnaire based on the provided response.

The results show that older participants and women have a greater interest in the museum. This can be seen in Figure 5, which shows that most respondents are in the 51- to 59-year-old age group and 77.2 per cent are women. An aspect that may cause some bias concerning the results is whether the respondents reached by FEK social media and newsletters are effectively representative of the museum's public.

Another example of charts generated using this instrument shows user environment perception of different locations in the museum in contrasting seasons, related to the building performance. Figure 5 shows visitors' environmental perception related to visiting the indoor areas in the summer and winter.

The charts illustrate (Figure 5) that visitors consider the house to be thermally comfortable during both the warmest and coldest season of the year. This is justifiable, at first, because the building construction system consists of double perimeter masonry and a ceiling that varies from 3 m to 4.9 m high, and the historic house museum's location, in the Southern Cone, in a subtropical region, with moderate climatic conditions (SON et al., 2016).

Checklists

A consistent analysis of the current physical conditions of the case study and its surroundings is an important element of POE and was attained through walkthrough checklists.

Using these instruments made it possible to evaluate, in the first approach, whether the physical and environmental conditions of the urban surroundings, the garden and the building were suitable both for visitors and staff members, as well as for the collection that the institution houses.

The checklists were conceived to evaluate five main categories: functionality, safety, accessibility, building performance and learning, the latter an aspect of particular interest of the researchers, although, in contrast to the other categories mentioned, not as usual in a POE.

The categories were measured by comparing the existing conditions with defined requirements taken from Brazilian technical standards.

In order to apply the external urban checklist, the researchers walked around the block where the institution is located, identifying some important points, especially regarding the accessibility criteria as in public transportation availability and adequate sidewalks, as illustrated in Figure 6 below.

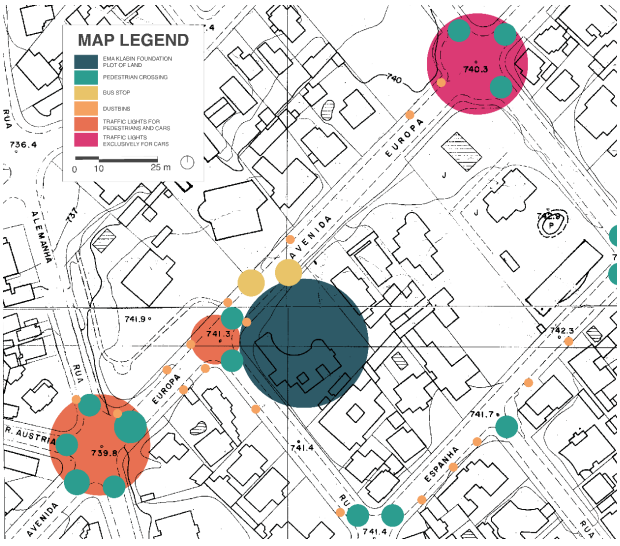

Figure 6: 'as-built' information on the urban surroundings.
Source: Cansado (2021), adapted from Seção Técnica de Geoinformação e Produção de Bases Digitais – CESAD – Faculdade de Arquitetura e Urbanismo da USP.

The sidewalks were carefully studied and compared to the technical standards, concerning their width, the existence of barriers, positioning of trees, mapping of parking spaces, crosswalks, and traffic lights.

The checklist consisted of four lists concerning each aspect mentioned above, one for each street surrounding the historic house museum, for a full assessment of the neighbouring urban area. This checklist was carried out before the pandemic period.

Regarding the study of the museum's internal environments, the 'as-built' floor plans were developed, signalling the arrangement of the furniture, the fixtures of electric power, suspended objects, and any potential barriers in circulating areas (Figure 7). This checklist also focused on accessibility, but included fire safety and building performance, which comprises the construction system and the environmental adequacy.

The external checklist revealed that the sidewalks have appropriated width, however, there are also a significant number of obstacles that compromises the urban surroundings' walking accessibility and safety. Lampposts, tree trunks and signalization were the most observed obstacles, furthermore, most pedestrian crossings do not have curb ramps.

Through the Internal checklist the researchers were able to map the most critical aspects regarding the building's performance. Rainwater infiltration was responsible for the most damage in the structure, being obser-

Figure 7: 'As built' of FEK.
Source: Cansado (2021), adapted from arte3.

ved in multiple environments within the building. The climate condition in this part of the Southern Cone is characterized by heavy rain during the summer period, which, coupled with the numerous trees surrounding the house (whose leaves frequently clog the installed gutters), means that the rainwater is not properly drained.

The problems observed in FEK's urban surroundings and internal spaces may put at risk its users and the collection housed in the building, respectively. These results obtained from the walkthroughs using the checklists were recorded and combined with the instruments applied to the users, developing summary tables and maps regarding diagnosis and recommendations.

Conservation

An aspect of special attention from the researchers was the actions put in practice by FEK's management to conserve the objects housed in the building concomitantly to the preservation of the building itself, as it became frequent, including internationally, the climate control decoupled from the original architecture (PADFIELD; LARSEN, 2004), which can mischaracterize the building. This could be unthinkable in the case of the museum typology of historic house museums, and it is important to study similar examples and guidelines that promotes the conservation of the building and its collection, such as Claudia S. Rodrigues de Carvalho's (2012) research regarding the conservation of surfaces of the Rui Barbosa Museum, another important Brazilian historic house museum.

Addressing the preservation issue of objects inside the FEK, in addition to the care in handling the items in the collection and the house itself, there are other conservation measures that require attention, such as the environmental control of the spaces where the collection items are found (PADFIELD, 2005) to protect them from agents of deterioration, which are factors that can be detrimental to the collection as a whole.

The deterioration agents, as proposed by the Canadian Conservation Institute (CCI, 2017) are physical forces, theft and vandalism, pests, pollutants, incorrect lighting, incorrect temperature, incorrect relative humidity, water and fire. These elements are directly related to the constructive quality and the quality of the internal environment. That is why it is necessary to evaluate and monitor the building performance if it is desired to prevent damage to the collection (and thus avoid or reduce the costs and technical implications of restoration activities).

As has been mentioned, water is a deterioration agent that has been troubling the museum: despite frequent cleaning, the gutters are constantly clogged with leaves of nearby trees, and rainwater has infiltrated the roof in many environments. The management has installed additional draining and waterproof structures over the years (as Figure 1 shows) and even though this has improved the situation, the infiltration is still present and there have been some studies regarding a complete roof reform.

Also, at FEK historic house museum, the direct (and indirect) incidence of sunlight may be a problem in certain environments, as the Gallery: in addition to its North orientation, which, considering its specific location in the Southern Cone, represents the façade that receives the most amount of sunlight, it has large windows, which means an intense direct incidence of sunlight in the exhibition environment. As this can be detrimental to the collection, FEK maintains these windows closed and installed film on the windows to filter UV rays.

The solar orientation, in the case of the Gallery, the Master Bedroom and the Library, only became a limitation after the change of use of the house to a museum: concerning its longitude and latitude, a house oriented to the North is the most adequate for its residents, however, it can be extremely harmful to the collection due to the intensity of natural light that penetrates the environments. It is worth mentioning this contradiction between the design requirements of a house and the ideal situation in the case of a museum and how this transformation - from a house to a museum institution - changes these requirements without changing the space where the collection is exposed or kept (museum storage).

Regarding the building conditions and performance previously mentioned, FEK, concerned with how environmental conditions could affect its collection, installed data loggers to monitor the temperature and humidity distributed throughout the main building environments, as these 'factors cannot be eliminated, and the determination of suitable values, based on an understanding of the mechanisms of deterioration to which these factors contribute, becomes critical' (PETERS, 1996).

FEK uses several passive means of climate control, such as determining a maximum number of visitors inside the house, so that the humidity does not increase above the reference values, in addition to the protection adopted closing and coating the windows from the Gallery. These measures have been sufficient to control temperature and humidity inside the building, without resorting to means that could affect the original characteristics of the house.

Results

After collecting the data and processing the information obtained from the methodological procedures, cross-referencing of users' environmental perception and researchers' view was carried out, making diagnoses and recommendations, as outlined in the proposed POE.

Regarding the representation of the results, the following were created: 'Diagnosis and Recommendation Summary Tables' (DRSTs) to gather all the results obtained in a single document and 'Diagnosis and Recommendation Maps' (DRMs) (ONO et al., 2018). The maps consist of a visual representation of the main aspects addressed in the tables, locating them in the studied environments. The categories evaluated in the DRSTs and DRMs instruments were functionality, safety, accessibility, building performance and learning.

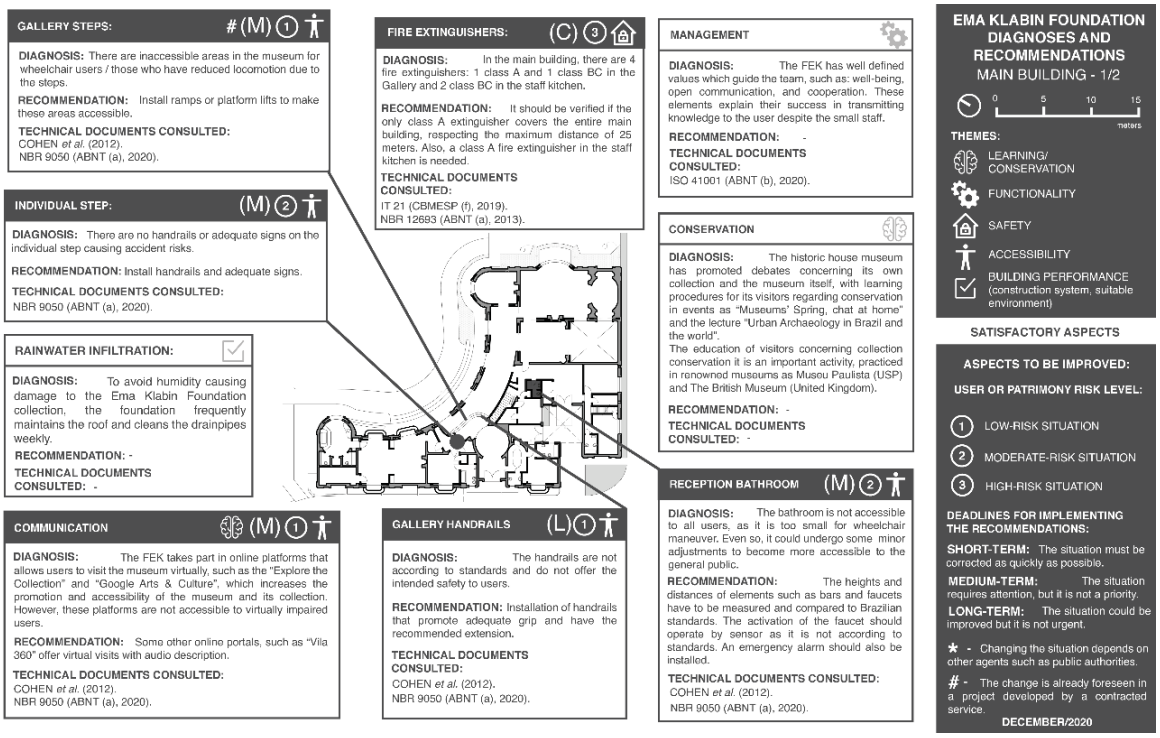

Figure 8: Diagnosis and Recommendation Map. This particular map addresses the main aspects observed in the FEK Main Building. Source: Cansado (2021).

The mentioned requirements were evaluated in different situations observed throughout the research and compared to normative references (ABNT 2020a, 2020b, 2013) (CBPMSP 2019), and guides to good practices (COHEN; DUARTE; BRASILEIRO, 2012), so that it could be observed whether there is a need to adapt to the relevant standards (if the situation is satisfactory or not) and the urgency with which this adjustment would have to be made. The system that determines urgency comprised two elements that are intrinsically related: the level of risk and the deadline for implementing the recommendation. The risk level is divided into low 1), moderate 2) and high 3) - the greater the risk, the shorter the implementation period should be, which may be short 1), medium 2) or long 3).

The previous Figure 8 shows one of the DRMs composed for the Main Building, demonstrating the results that can be obtained using these methods.

These DRMs are designed so that the managers of a given museum can view in a single document consolidated diagnoses and, as far as possible, some guidelines for design, physical interventions/maintenance and management aimed at restoration, renovation and/or readjustment by theme and performance requirements and criteria. They will also be able to contribute to defining possible guidelines for future projects with similar usage characteristics.

For this contribution to be systemic, DRMs need to be updated periodically: considering the importance of the building, its garden, and collections, it would be desirable to maintain the biennial periodicity of the POE, thus contemplating the incorporation of new diagnoses and recommendations in the database and the updating of the DRMs.

DISCUSSION AND CONCLUSIONS

Using POE methodological procedures enabled us to measure the performance of the built complex and gardens and the urban surroundings close to FEK, as well as the levels of user environmental perception, to guide maintenance, operation, and use of these environments.

It was also found that there is a possibility of using some online instruments to measure user environmental perception, while the walkthrough activities and checklists, and other technical surveys, are carried out in loco by the researchers/evaluators or by trained technicians. These findings were the result of conducting part of the research during the pandemic period, which represented many challenges to the research process that – thanks to the support of FEK's management and staff, and the adaptation and use of online instruments – did not prevent the achievement of the proposed objectives: despite the impossibility of the researchers to conduct part of the study *in loco,* all proposed instruments and analysis were carried out and resulted in a deep knowledge and understanding of FEK's built environment, its garden and its surroundings. On the other hand, the impossibility of using specific instruments in person entails complementing the results in future research.

Regarding the object of study in question, instruments for developing diagnoses and recommendations aiming at heritage preservation brings the possibility of conservation not only of the mobile collections housed there, but also of the building itself.

In other words, POE is a particularly strategic approach in historic house museums such as the case study, in which the use has been changed, but its environments have been maintained according to the original occupation. It important to find the challenging balance between adapting the existing building and its garden for its current use and preserving them, as they are part of the collection itself.

Adopting POE as a routine over time can help non-invasive procedures and protocols and the complement notices aimed at contracting projects and in monitoring and managing interventions to provide the most suitable, cost effective and preventive maintenance and, when necessary, corrective maintenance.

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