Original article

Analysis of facade solutions as an alternative to demolition for architectures with visual impact in historical urban scenes

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A B S T R A C T

Some urban regulations oblige to replace buildings with visual impact in the surroundings of a historical monument, what implies undesired sustainable and social consequences. We conducted a study to evaluate if alternative façade solutions can improve the assessment of cityscape integration and preferences for six tall buildings with visual impact in the surroundings of the Serranos Towers of Valencia (XIVth Century). Results show that, although replacing buildings is the most integrated solution, some alternatives also improve the landscape integration of visually-impacting architectures and are better preferred than demolition. Citizens are in favor of intermediate positions between actual state and demolition, with people unfamiliar with the area more inclined towards demolition.

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1. Introduction

In recent years, there has been a growing awareness of the protection of architectural heritage in historic city centers, not only with the identification of monumental buildings, but also with the definition of protected areas around them [1]. More specific and restrictive regulations assure that the urban activities in these protected areas do not impair the historical and aesthetic values of the monument [2]. Many times, to solve the problem of visibility for tall buildings with visual impact in protected areas, regulations oblige the replacement by lower structures [3]. However, this replacement is an urban solution that has a difficult short-term management, not only because of the social consequences that will entail, but also because requires the arbitration of formulas to compensate for the loss of buildability that were once legally authorized. The result is that these "ugly" architectures keep bothering the vision of many historical landscapes in European cities.

To reduce the visual impact of such tall buildings, urban planners should consider preservation of the existing structures and alteration of the facades, as alternative and more sustainable practices than demolition. The design strategy for these new facade solutions might adopt any position between two conceptual extremes. The first design strategy is to work with invisibility as the main criterion for the visual integration, seeking for the disappearance of out-of-place structures and giving priority to the historical image. The second design strategy works with a new aesthetic and meaning for those tall buildings, not to make them disappear but even to emphasize their presence, with the aim to increase the cityscape visual quality. This second design strategy is rooted in the concept of a new place identity and imageability for the city. The city of Valencia is a perfect case study, as it moves between the preservation of its historical identity and the construction of a new global image.

1.1. Harmony and coherence to preserve the historical place identity

The aim of the integration of visually-impacting buildings in historical city centers is to prevent loss of place identity [2,4], or the *genius loci* [5]. Thus, in historical city center, the architectural criterion is usually to harmonize new architectures in order to assign prominence to the ancient monuments [6], yet to completely hide those urban structures with negative impact [7]. This is also reflected in urban regulations that encourage the harmonization with traditional structures [8,9]; and may be rooted in the opinion of citizenry, that often prefers that new buildings are not noticeable [10]. This conception is consistent with those environmental impact assessment studies that work with invisibility as the main criterion for the visual integration, seeking for the disappearance of some manmade structures in natural landscapes [11–13].

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Studies in the scientific literature have proposed that visual *harmony, unity* and *coherence* are key factors in the evaluation of the scenic beauty of landscapes (for a literature review, see Sowińska-Świerkosz, 2016 [14]), although many of these focus on natural environments, such as coastal landscapes [15], or industrial facilities in natural environments [16], but rarely feature city-based studies [17]. In one of the most in-depth studies into *coherence*, Stamps summarized this term by asking: 'How well a scene hangs together. How easy is it to organize and structure the scene?' [18]. Some authors have found that *coherence* estimations has a high correlation with preference ratings [19,20].

1.2. New place identity and imageability

Disappearance or harmonization is not the only possible approach to solve the problem of buildings with visual impact in protected areas. An alternative is to create a new place identity that does not fully correspond with the historical structures and their traditional image in order to seek a higher cityscape visual quality, a new imageability.

Imageability and complexity are considered important subjective qualities of the urban street environment [21], and previous research demonstrates that accent building colors are key element that provide a street with complexity, and so improve the visual richness and interest for pedestrians [22]. A new place identity can be achieved by giving new buildings a certain presence, so that change and conservation can coexist [2], and not necessarily fit them into the environment [23]. This is a challenge for designers as recent research demonstrates that contemporary architectural styles – inspired by postmodernism and characterized by asymmetry, lack of ornamentation, and industrial appearance – are evaluated less positively than traditional styles – characterized by symmetry and ornamentation [24]. Nevertheless, we find outstanding well-recognized examples of contemporary buildings in traditional city centers, such as the Barcelona Museum of Contemporary Art (R. Meier, 1995) or the Guggenheim Museum in Bilbao (F. O Gehry, 1997) that provide urban identities that go beyond the local to create a global imageability for the city [25].

Some studies on the impact of tall buildings on city skylines have suggested that, in the judgement of observers, the meaning and aesthetic of structures are more influential than their visibility [24,26]. And, that 'tall buildings are not necessarily a threat to the built heritage in particular locations, particularly when they are managed in a positive way as part of a deep understanding of the character and distinctiveness of place' To create a new skyline can be a possible way to redefine the identity of the city [27].

Some authors have argued that where one disharmonious construction exists, the presence of another affects landscape unity to a considerably lesser extent [14]. In fact, in the residential neighborhood of Richmond in San Francisco, Stamps studied subjects' preferences for a series of Victorian houses with different numbers of stories, and demonstrated that 'the least liked blocks were the blocks in which only one building was different, it did not matter if the different building was larger or smaller' [28].

Visual impact may not always have negative connotations, and it is worth delving into the meaning of concepts such as integration and preference. In this regard, it is important to investigate the visual impact of sets of buildings in urban heritage environments, with the aim of improving their image until the day they can be replaced, if necessary.

1.3. Valencia between a historical identity and a global image

The city of Valencia has transformed its identity within a few years from being a 'provincial, agrarian city to a regional capital and Mediterranean metropolis', with the historic center being an important tourist attraction [29], together with other contemporary urban planning projects such as the City of Arts and Sciences by architect S. Calatrava (1998). The aim of Valencia's urban planning has been to fulfil 'wider territorial ambitions in an increasingly integrated and competitive Europe', what some authors have labeled *cultural landscape* planning [30]. In this globalized context, in which cultural image dominates, 'a building or a group of buildings serve to sum up the city in its entirety' [31].

The Serranos Towers are definitely one of these iconic buildings throughout history [32], placed in the northernmost Christian-era city wall that ran along the river Turia. They are represented in the drawings by the Dutch traveler Wijngaerde, 1563 (Fig. 1), showing a small and compact Valencia [33]. This image of a well-defined city is maintained in later representations by Manceli (1608), father Tosca (1704, 1738), Guesdon (1855), and is firmly rooted in the historical memory of the citizenry.

Nevertheless, after the walls were demolished, Valencia broke the idea of unity expressed in the drawings, and the urbanscape dynamics evolved from a traditional landscape, through an expanding industrialization landscape, up to a postmodern landscape characterized by increasing globalization and urbanization [4].

Since 2004, the Valencian public administration has promoted laws aimed at preserving the quality of the natural and urban landscape, with the elaboration of "Landscape Integration Studies" [8]. Every modification of urban regulations requires a Visual Analysis of the Landscape, which must identify possible visual impacts [34]. In the case of the historic center of Valencia, the instrument to regulate the urban scene around the historical buildings has been the Special Protection Plan, with its corresponding Landscape Integration Study [3]. This plan is developed by a group of experts and identifies the values and significance of every protected monument, indicating the historical, cultural, architectural, urban and ambient values. At the same time, the plan indicates those "inadequate elements and buildings" that can hinder the protected values of the monuments and require an intervention that can range from (1) the treatment of facades, dividing walls or fences; (2) to the declaration of the building Out of Ordinance and its definite substitution, since it is forbidden any construction different to "conservation works" [9].

2. Research aim

The main objective of our research is to know if there are alternative solutions to demolition that can improve the cityscape integration and preferences for tall buildings with visual impact in the surroundings of a historical monument. The hypothesis is that the substitution of tall buildings for lower ones is not the only possible solution for visually-impacting architectures, and new facade treatments can be an alternative to their replacement.

To this end, we assess the opinion of citizens about two notions that might have different connotations and are key concepts for urban planning: the visual integration and the preference (like/dislike). Finally, visual integration and preference will be compared with the individuals' predisposition to architecturally intervene in the historical site.

3. Materials and method

We take as case study six tall buildings with visual impact in the surroundings of the Serranos Towers of Valencia that local regulations declare Out of Ordinance [35] (Fig. 2). These inadequate buildings come from the indiscriminate replacement of the traditional constructions that conformed the northern façade of the city, with buildings that exceed the height corresponding to five floors that can be considered as the average in this part of the consolidated historical city [35]. Other affections of these buildings to

Fig. 1. View of the City of Valencia (fragment of the original). *Source: Antonio Van Den Wijngaerde, 1563 (Osterreichische Nationalbibliothek, Cod. Min 41.f.1).*

Fig. 2. Photograph of the facades in Blanquerías Street, with an indication of the required cornice height. The buildings that exceed this height must be replaced under the terms of the Special Protection Plan (PEP).
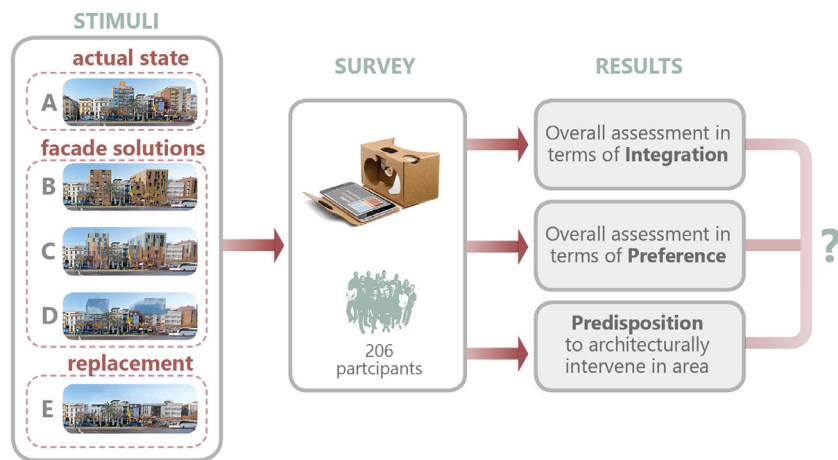

Fig. 3. Scheme of the methodology.

the values of the protected environment indicated in the regulations are: (1) inadequate building depths that surpass those that are common in traditional building; (2) the visible and untreated dividing walls generated by their excessive volume, (3) the treatment of the composition and materials of the facades, with the use of bricks in dark colors, an emphasis on cutting unrelated to traditional building, and even (4) the alteration of historical divisions of the city parcels [35]. .

We develop 5 possible scenarios, each with a different facade proposal for these buildings with visual impact that are observed with 360° involving panoramas and assessed in terms of integration, preference and predisposition to architecturally intervene in the area (Fig. 3).

3.1. Stimuli: Description of the facade solutions

We developed five possible scenarios for Blanquerías Street, each with a different facade proposal for the buildings with visual impact. Considering the historic image, with a uniform city wall, and the evidence that homogeneity between buildings is more important than scale in visual aesthetics [28], we decide to use the same facade solution in all the tall buildings corresponding to the same scenario.

The five scenarios were designed considering the two aforementioned extreme conceptual positions in visual integration; visibility/new place identity versus invisivility/dissaperance at the other end. To this aim, each scenario provides a different solution

Fig. 4. Map with indication of the position for the 4 spheric panoramas along Blanquerías Street. Detail of panoramas 1 and 3, for the five scenarios: A–D.

with regard to excess building height, from most to least visibility: maintain the current status with the current height (A), maintain the current height but with a uniform image (B), mitigate the visual height of the taller buildings with colors (C), make the upper parts of the buildings invisible with mirrors (D), and replace the buildings with lower structures (E) (Fig. 4).

3.2. Visualization system

In landscape integration studies, images, both in analogue and digital mode, are the most commonly-used and accepted type of stimulus [36–39], being evidence that the observation pattern is different in panoramic and detail photographs [40]. In recent years, researchers are using VR models to assess the visual quality of urban areas [41] and the use of immersive virtual environments as a replacement of reality has been proven to be a reliable method for subjective assessments [42].

In our study we used four immersive panoramic photographs in each scenario, with visual fields of 360°. These allow buildings to be evaluated in relation to their entire environments and not just in established photographic frames. The five scenarios were observed through an application that we developed on Android, called 'LandArch: Visual Impact Evaluation'[1]. After this observation, participants were automatically addressed to an online survey to complete the questionnaire with no time limitation.

3.3. Questionnaire and participants

The questionnaire contained the following information: (1) Personal data, (2) Overall assessment of the 5 scenarios in terms of integration, putting into order from the most to the least integrated, (3) Overall assessment of the 5 scenarios in terms of preference putting into order from the best to the worst, (4) predisposition to architecturally intervene in the area, with an agree/disagree check list of 5 statements.

A homogeneous group of 206 individuals (43% men, 57% women; aged 20–60; 60% with tertiary education, 40% with secondary education; 47% living in Valencia, 53% living outside Valencia) was recruited in a public participation conference attended by

neighborhood residents near the Serranos Towers, and university students. This public conference included the speaking of invited experts (the architects responsible of the Special Protection Plan, an architect member of the Infraestructure and Landscape Service of the *Generalitat Valenciana,* and scholars specialist in heritage restoration) and an open discussion with neighbors of the local association *Amics del Carme,* about the different scenarios in relation with the monument to preserve. As explained by the experts, the significance and values to preserve of the Serranos Towers are:

(a) Architectural Values: The whole building as a defensive structure belonging to the medieval city walls, with a particular shape, structure, building technique, ornaments and style.
(b) Historical values: Those related with historical, social and political facts, which are independent of the urban or architectural value.
(c) Scenic values: Because the building contributes to maintaining a part of the territory as it has been perceived by the populations, whose character results from the action of natural and / or human factors and their interrelationships.

Among the three types, the disturbing buildings in the surroundings affect to the scenic values because they do not fit with the basic parameters of traditional buildings in the area, particularly in height, building depth, presence of dividing walls, materials and styles of the facades and the division of the historical parcels. Certainly, when we decide to keep the existing built volumes, we assume that none of the facade solutions respect any of the parameters of traditional buildings, just the height is visually mitigated, so the comparison of the scenarios in terms of scenic values seems inadequate. For this reason, we opted for a questionnaire in terms of integration and preference, which is a way of expressing an overall opinion for a scenic assessment.

3.4. Experimental process

The participants graded the 5 proposals from best to worst, and from most to least integrated, and we assigned a score from +4 to 0 for the variable calculation. Analysis of assessments in terms of integration and preference included: (1) Frequency analysis for each scenario; (2) Analysis of the means for each scenario with a Wilcoxon signed-rank test; and (3) Exploration of assessment differences between groups with ANOVA.

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[1] Search in Google Play with the name 'LandArch: Evaluación del Impacto Visual'
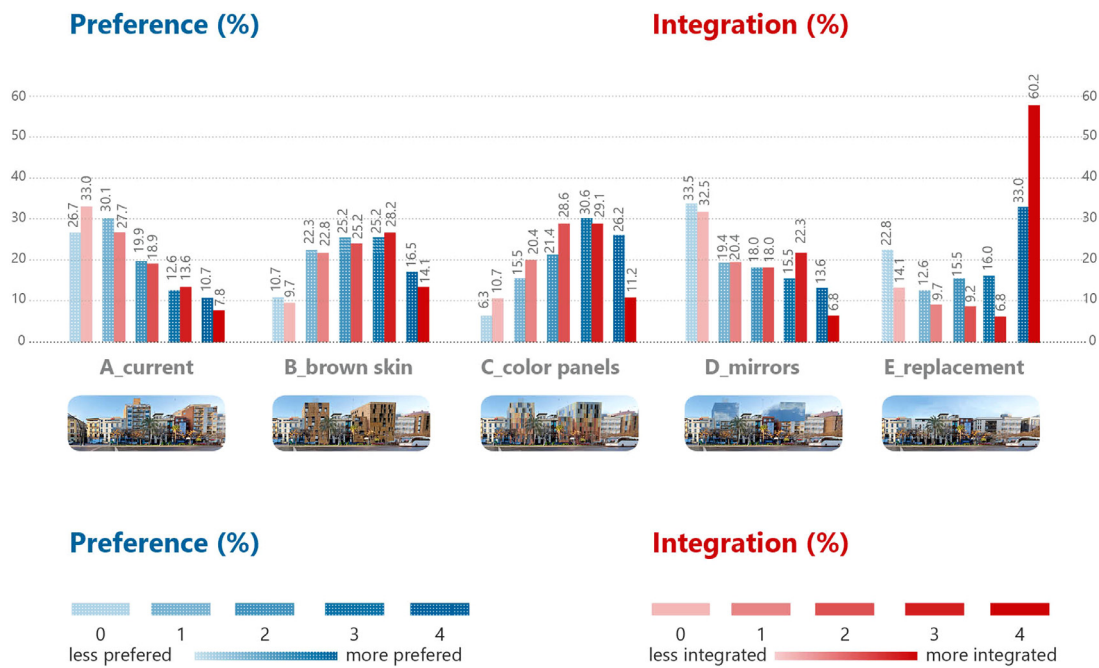
Fig. 5. Percentage score for each proposal in terms of Integration and Preference.

To evaluate the predisposition to intervene in the area, participants were asked to answer five statements in terms of agree/disagree. The selection of these statements allowed to group the observers in 5 categories, from those who opt for the demolition of buildings to those who do not want to intervene at all, with a frequency Analysis.

4. Results

4.1. Analysis of assessment, in terms of integration and preference

4.1.1. Frequency analysis for each scenario

Fig. 5 shows the percentages of respondents for the 5 scenarios in terms of preference and integration from least to most. We notice that integration and preference have similar distributions, with only small differences. In A_Current State, we appreciate a descending linear tendency: most of participants chose A as the least preferred/integrated option (26,7%; 33%). D_mirrors also follows a descending tendency, with a significant group of participants who chose it as the least preferred/integrated option (33,5%; 32,5%). Scenarios B_Brown Skin and C_Color Panels show a bell-shaped curve for integration and preference, with intermediate positions. There is a noticeable difference between participants who found C_Color Panels as the most preferred (26,2%) and those who found it as the most integrated (11,2%). E_replacement is the scenario which shows most extreme opinions, 60.2% of participants perceive it as the most integrated solution, but only 33% regarded it as the best, while 22,8% regarded E as the worst.

4.1.2. Analysis of the means for each scenario

Fig. 6, shows the mean evaluation for each scenario in terms of integration/preference. The most integrated solution is scenario E_Replacement (mean: 2.89; dev: 1, 53), followed by B_Brown Skin (mean: 2.14; dev: 1.20), C_Color Panels (mean: 2.10; dev: 1.17); D_Mirrors (mean: 1.50, dev. 1.33) and being A_Current State (mean: 1.36; dev: 1.28) the least integrated scenario (IE> IB> IC> ID> IA). Rsults show that the most preferred solution is C_Color Panels (mean 2.55; dev: 1.21), followed by E_Replacement (mean: 2.24; dev: 1.57), B_Brown Skin (mean: 2.15; dev: 1.24), D_Mirrors

(mean: 1.56; desv: 1.43) and being A_Current State (mean: 1.50; dev: 1.23) the least preferred scenario (PC> PE> PB> PD> PA). When we compare the means for preference and integration in each scenario, we notice that scenario C_Color Panels is the most preferred (2.55), but not the most integrated (2.10). On the contrary, scenario E_Replacement is the most integrated (2.89), but is in the second position in preference (2.24), after C_Color Panels (2.55). We perform a Spearman test correlation analysis and find that preference and integration have significant correlation in the five scenarios (Fig. 6).

We use a Wilcoxon signed-rank, which is a nonparametric test to compare related samples, to explore if the population mean ranks for integration/preference differ for the 5 scenarios, comparing in pairs (Fig. 7). The results show that there is a significant difference in the means for integration of scenario E_Replacement, considered the most integrated, compared with the other four. Scenarios B_Brown Skin and C_Color Panels are significantly considered more integrated than D_Mirrors. Compared with A_ Current State, just solution B_Brown Skin, is significantly more integrated. Regarding preference, scenario C_Color Panels is significantly the most preferred, compared with the other four. E_Replacement is significantly more preferred than A_ Current State and D_Mirrors; scenario B_Brown Skin is significantly preferred over A_ Current State and D_Mirrors; and A_Current State is significantly the least preferred scenario compared with B, C, and E.

4.1.3. Exploring assessment differences between groups

We use ANOVA to analyze significant differences in the means for overall assessments (integration /preference) according to groups with different age, gender and degree of knowledge of the area. Only significant differences were found (for a significance level of 0.05) according to the familiarity with the zone. Difference in preference where significant in every scenario except in A_Current State. Comparing both groups, we notice that people who do not know the place are more likely to replace buildings (E) or to alternative solution C_Color Panels, while those who know the area compared with the others give higher ranks in solutions B_Brown Skin and D_Mirrors. Nevertheless, there are no significant
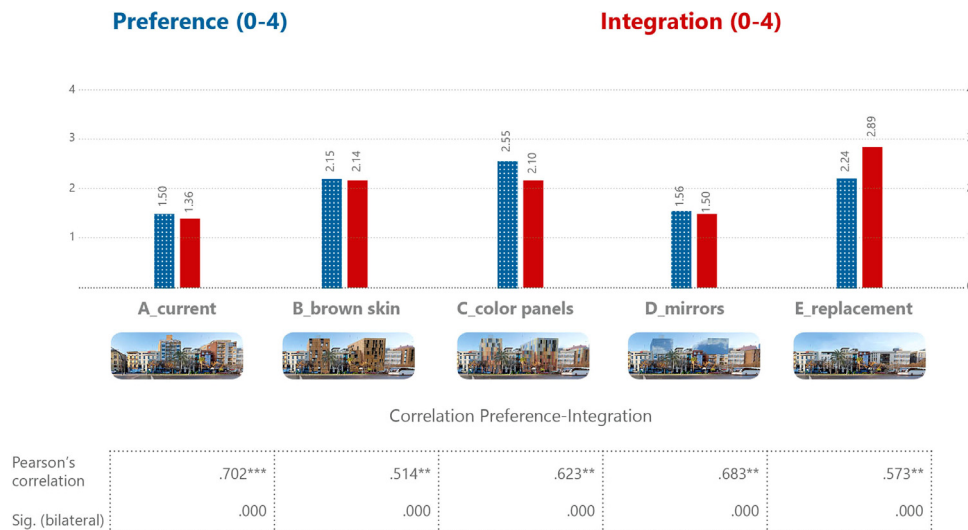
Preference (0-4)　　　　　　　　　**Integration (0-4)**

	A_current	B_brown skin	C_color panels	D_mirrors	E_replacement
Pearson's correlation	.702***	.514**	.623**	.683**	.573**
Sig. (bilateral)	.000	.000	.000	.000	.000

Correlation Preference-Integration

Fig. 6. Mean Evaluation, from 0 to 4, of the five scenarios in terms of Preference and Integration, with the Pearson's correlation analysis.

PREFERENCE

	A	B	C	D	E
A	--	PA<PB p=0.000	PA<PC p=0.000	NO sig. p=0.624	PA<PE p=0.000
B	PB>PA p=0.000	--	PB < PC p=0.002	PB > PD p=0.000	No sig. p=0.555
C	PC>PA p=0.000	PC > PB p=0.002	--	PC > PD p=0.000	PC>PE p=0.046
D	No sig p=0.624	PD < PB p=0.000	PD < PC p=0.000	--	PD<PE p=0.000
E	PE>PA p=0.000	NO sig. p=0.555	PE<PC p=0.046	PE>PD p=0.000	--

INTEGRATION

	A	B	C	D	E
A	--	IA<IB p=0.000	IA<IC p=0.000	NO sig. p=0.314	IA<IE p=0.000
B	IB>IA p=0.000	--	NO sig. p=0.916	IB > ID p=0.000	IB < IE p=0.000
C	IC>IA p=0.000	NO sig. p=0.916	--	IC > ID p=0.000	IC<IE p=0.000
D	No sig p=0.314	ID < IB p=0.000	ID < IC p=0.000	--	ID<IE p=0.000
E	IE>IA p=0.000	IE>IB p=0.000	IE<IC p=0.000	IE>ID p=0.000	--

Fig. 7. Analysis of correlations in the means for preference and integration in each scenario. Wilcoxon signed-rank test.

differences according to the familiarity with the zone, in the preference for A_Current State. (Fig. 8)

4.2. Analysis of predisposition to intervene

The participants can be classified according to their willingness to intervene into 5 groups between the extremes of "maintain current status" and "replace buildings" (Fig. 9)

Pred. 1: People who do not support intervention because they do not believe that the current state has any visual impact and agree with scenario A (20%).

Pred. 2: People who support current state A, or any of the facade intervention solutions B, C, D (13%).

Pred. 3: People who support any of the facade intervention solutions B, C and D (45%).

Pred. 4: People who support any of the facade intervention solutions B, C, D or E, replacement (14%).

Pred. 5: People who believe that E, replacing the buildings, is the most appropriate solution (8%).

There were no cases of participants simultaneously supporting non-intervention and replacement, and therefore these five predispositions include all the casuistry of the responses. The analysis of the results confirmed that 33% would agree to maintain the current status (pred. 1 + pred. 2), 72% would agree with any intermediate facade solution (pred. 2 + pred. 3 + pred. 4), and 22% would agree to replacement (pred. 4 + pred. 5).

5. Discussion

Our study analyzed different architectural solutions to improve the visual quality of a historical urban environment with visually-impacting buildings. We assessed participants' opinions on the landscape integration and preferences for five possible scenarios for six tall buildings in the surroundings of the Serrano Towers in Valencia with different formal solutions: maintain the current status, mitigate the visual weight of the taller buildings, make the upper parts of the buildings invisible, and replace the buildings with lower structures. All scenarios treated the buildings as a set, and sought for a homogeneous image, an important aspect indicated in landscape integration studies [14,28].

In terms of methodology, we designed a mobile application ('LandArch: Visual Impact Evaluation') to allow participants to look to any direction in an involving spherical environment and avoid a bias when a visually impacting building is framed into a picture [43]. A number of 206 participants were asked to order the 5 scenarios from most to least integrated, and from most to least preferred, and to check among 5 statements that encapsulated their predisposition to support an intervention in the area.

The results show that the most integrated option, on average, is E_Replacement (2.89), followed by B_Brown Skin (2.14), C_Color panels (2.10), D_Mirrors (1.5) and A_Current State (1.36) (IE> IB> IC> ID> IA). There is a significant difference in the means for integration of scenario E_Replacement, compared with the other four. It is unsurprising that replacing tall buildings with others of the same height is considered the most integrated option, as other studies have shown that similarity in form, materials and

Preference (0-4)

know the area   don't know the area
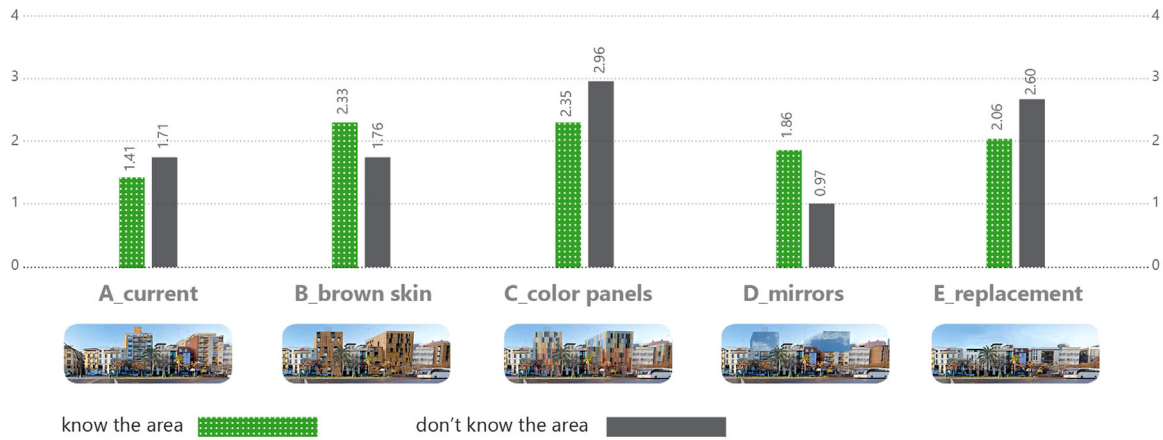
	ANOVA				
	Source	SS	df	MS	F	Sig.
A	Inter-groups	4.102	1	4.102	2.451	.119
	Intra-grous	341.393	204	1.673		
	Total	345.495	205			
B	Inter-groups	14.729	1	14.729	9.920	.002
	Intra-grous	302.902	204	1.485		
	Total	317.631	205			
C	Inter-groups	16.843	1	16.843	12.091	.001
	Intra-grous	284.172	204	1.393		
	Total	301.015	205			
D	Inter-groups	35.637	1	35.637	18.881	.000
	Intra-grous	385.043	204	1.887		
	Total	420.680	205			
E	Inter-groups	13.529	1	13.529	5.589	.019
	Intra-grous	493.816	204	2.421		
	Total	507.345	205			

Fig. 8. Median Evaluation, from 0 to 4, of each proposal in terms of Preference, depending on familiarity with the area. ANOVA.
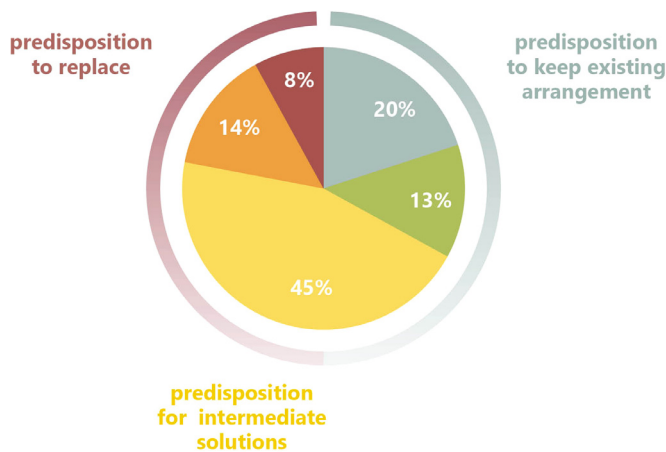

Fig. 9. Predisposition to intervene, considering current state (A), replacement (E) and others (B–D).

colors between a building and its surroundings favor its landscape integration [44,45]. Compared with A_Current State, just solution B_Brown Skin is significantly more integrated. It is noteworthy considering that in B_Brown Skin, those buildings with visual impact all have the same scale, skyline or silhouette as the current state, and it indicates that there exist alternative solutions to demolition in order to increase the integration of tall buildings. This can be explained by the fact that in scenario B the buildings have

a homogeneous facade treatment from bottom to top, and there is scientific evidence that coherence and continuity reduce the aesthetic impact of elements in a landscape [46,47]. It is interesting to note that scenario D is significantly less integrated than B_Brown Skin and C_Color Panels, despite its attempt to reduce the impression of the height of the buildings using mirrors. Scenario D is the only one that shows a facade solution that is not uniform from the ground floor to the roof, in coherence with pevious studies demonstrating that the aesthetic impact is affected by the complexity of the upper parts of a building [48]. Therefore, the lower visual integration of scenario D could be related to a lower uniformity in the design of the facade from the street level to the top.

Regarding preference, the results show that the best scenario, on average, is C_Color Panels (2.55), followed by E_Replacement (2.24), B_Brown Skin (2.15), D_Mirrors (1.56) and A_Current State (1.50) (PC> PE> PB> PD> PA). Scenario C_Color Panels is significantly the most preferred, compared with the other four. Interestingly, C has the most variegated colors, what is consistent with previous findings in natural landscape, in which higher hue variation and chroma encouraged higher visual fixation and preference [49]. On the contrary, A_Current State is significantly the least preferred scenario compared with B_Brown Skin, C_Colors, and E_Replacement, thus, the participants identified that the current state lacks visual quality. Observers might be considering any novelty better than actual state, with independency of the architectural solution, as some experiments indicate that novelty is a key factor in color preference evaluation for images [50]. The least preference for A_Current State can also be related with its lack of

homogeneity, in line with previous studies reporting homogeneity between buildings more important than scale in visual aesthetics [28], or indicating the importance of coherence in the assessment of the scenic beauty of landscapes [14,18]. When comparing the preference for the three scenarios B, C and D, D_Mirrors had the lowest rating, and is significantly less preferred than E_Demolition, and B_Brown Skin. As mentioned before, the lack of homogeneity from bottom to top might be in the roots of a lower preference.

Our study demonstrates that participants' opinions about landscape integration and preferences have significant correlation, as did in previous studies [10]. Nevertheless, scenario E_Replacement is rated the most integrated but not the most preferred, while the intermediate facade solutions B, C, and D are generally more valued in terms of preference than integration. Thus, some architectural solutions that differ in character and scale with respect to the environment might be preferred to replacement. Some authors have argued that, in historical landscapes, new architectures do not have to 'fit in' [23], and that visibility should not be the only criterion in visual impact assessments [51]. In addition, the fact that scenario B_Brown Skin is considered more integrated than A, and that C_Color Panels is preferred to E_Demolition, indicate that excess height is not necessarily the determining factor in the evaluation of aesthetic impact. Aspects other than a building's visibility have influence, such as aesthetics and meaning [26], and color can be an indicator of urban coherence and homogeneity [52].

When we explore assessment differences between groups, we find significant differences for the preference in all scenarios except A_Current State, depending on the familiarity with the zone. Current state is considered the least integrated and least preferred scenario independent of the familiarity with the area. Regarding the intermediate solutions B, C, D, people who did not know the place were more likely to C_Color Panels compared to those who knew the area that gave higher ranks to B_Brown Skin and D_Mirrors. It seems that answers from people familiar with the zone were more distributed among any of the three alternative solution while those unfamiliar preferred C_Color Panels and disliked D_Mirrors. It is interesting to note that those who did not know the area, as against those who did, were more likely to replace the buildings (E). Indeed, in other landscape integration studies in Valencia, respondents who lived in the immediate vicinity gave little importance to building height as a distorting element of the landscape, with less than 1% supporting height reduction [3]. Certainly, there is an emotional and social place attachment, a particular bonding that occurs between individuals and their meaningful environments [53] that is superior in large cities than in the small ones [54], and which might be a determining factor in perceiving the visual impact of architectural interventions.

The participants predisposition to intervene in the area is segmented into 5 groups between the extremes of 'maintain current status' (pred. 1) and 'replace building' (pred. 5). Of the participants, 33% would agree to maintain the current status (pred. 1 + pred. 2), 72% would agree with any intermediate facade solution (pred. 2 + pred. 3 + pred. 4), and 22% would agree to replacement (pred. 4 + pred. 5). So, in general, most would agree with any intermediate facade solution.

6. Conclusions

Our study demonstrates that, although building replacement (E) is the most integrated solution, less drastic alternatives (B) based on a redesign of the exterior facades, can also facilitate the landscape integration of visually-impacting buildings into the urban landscape compared with their current state (A). Coherence, unity and the redesign of the upper parts of the building seem to be important features. Regarding preference, results indicate that there are alternative solutions (C) to demolition (E) that are better pre-

ferred than the current state (A) and homogeneity from bottom to top, together with variety in colors in the claddings, seem to be key features. We conclude that the majority of citizens (72%) would be willing to support one or other of the facade intervention solutions as an alternative to the current state (A) or replacement of the buildings (E), with people unfamiliar with the area more likely to support replacement.

It will be important in the future, in much transformed urban environments, to decide whether to choose to maintain the historical image and to pursue architectural solutions that favor landscape integration or, on the contrary, to adopt a new urban image that seeks to improve visual quality. Providing new facades for buildings with visual impact is an alternative to their replacement that will allow them to be visually and functionally adapted.

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