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1 **Examining the Effectiveness of Urban Planning Exhibitions in** 2 **Planning Communication: A Contextual Model of Learning**

3 **Abstract :** Urban planning exhibitions have been a long-standing element in planning
4 culture, on a worldwide level. Until now, there has been a considerable gap in
5 researching the efficiency of urban planning exhibitions in communication, especially
6 from a quantitative perspective. Rooted in communicative planning and built on
7 Generic Learning Outcomes and Contextual Model of Learning theory, this paper aims
8 to explore the role of urban planning exhibitions in communication and the factors that
9 influence their efficiency, using the recently opened Guangzhou Urban Planning
10 Exhibition Hall (UPEH) as an example. The 115 participants in this study were divided
11 into two groups (experimental and control) and asked to answer a series of urban
12 planning questions before and after visiting the Guangzhou UPEH. Results showed that
13 except for the level of education, the *personal* and *sociocultural* factors had no
14 significant effect on changes in participants' knowledge on the subject. However, the
15 *physical* factors of participants' visits, including the length of the visit, the number of
16 exhibits seen by participants and the degree of engagement with the top-rated exhibits,
17 significantly influenced learning about urban planning. The results demonstrated that
18 urban planning exhibitions can provide inclusive platforms in facilitating planning
19 communication and public engagement.

20 **Keywords:** planning communication, urban planning exhibitions, contextual model of
21 learning, repeated measures design

22 **1 Introduction**

23 Urban planning is a complex and multifaceted endeavour that aims at adapting the form
24 and function of cities to the diverse needs of stakeholders, and a means of bringing
25 about political, social and physical change (Hein, 2015). The current pace of
26 urbanisation has brought a growing awareness for pressing urban challenges. Finding
27 ways for more sustainably adapting cities towards the impacts of climate change, and
28 coping with critical resource scarcity is critical for cities globally (Odendaal, 2012).
29 This has become an important challenge for planning and design professionals,
30 engineers and the general public. Therefore, communicating contents of planning to
31 stakeholders is important for a shared understanding towards a sustainable development
32 of city regions (Chen et al., 2020; Shilon & Eizenberg, 2020).

33

34 To improve planning communication public hearings, discussion groups, and other
35 forms of participation have been tried with varying degrees of success as part of a
36 broader democratization process in urban planning that began in the 1970s, particularly
37 in European countries and the US (Li et al., 2020). In recent decades, the use of various
38 information and communication technologies (ICTs) in planning is expanding,
39 facilitating new ways for citizens and local residents to voice their opinions.
40 Implementation of ICTs in planning communication often focuses on a limited set of
41 media and with few real-world implementations to include wider audiences (Billger et
42 al., 2016; Eilola et al., 2023).

43 Urban planning exhibitions, on the other hand, have long been used as a real-world
44 communication tool to raise public awareness of urban planning. More than a century
45 ago, Patrick Geddes (1915) proposed the ‘Outlook Tower’ in Edinburgh as a forerunner
46 of a planning exhibition. Later, the ‘Futurama’ ride was installed at the New York
47 World’s Fair in 1939. Other examples include ‘The Hannover 2000 Expo’, which
48 served as the centrepiece for a confluence of world fairs, model planning and housing
49 exhibitions; ‘Barcelona in Progress’, a permanent exhibition featuring a 1:1000 scale
50 model of the city in 2004; and the idea of the ‘Urban Room’, which was proposed by
51 Farrell and put into practice in more than 15 British cities and towns, typically as pop-
52 up settings that were limited in size and scope (Tewdwr-Jones et al., 2020; Lu, 2021).

53

54 Urban Planning exhibitions differ in size and characteristics depending on budget and
55 planning context (Freestone & Amati, 2016; Hein, 2015). In particular in China with
56 its enormous growth and spreading of urban areas there has been a rapid increase in the
57 number of Urban Planning Exhibition Halls (UPEHs) recently (Fan, 2014; Wu, 2000),
58 totalling 880 UPEHs according to nationwide market survey (Chen & Chen, 2017).
59 UPEHs are often situated in large dedicated buildings in which a multitude of themes
60 focusing on past, present and future urban planning of a particular area is exhibited
61 through a broad range of visualisation tools (Fan, 2014; Lu et al., 2020).

62

63 Urban planning exhibitions share many similarities in terms of exhibition design,
64 including purpose of exhibition, visualisation media, and planning content. They serve
65 as tools for city branding, planning communication and public engagement (Carrière &
66 Demazière, 2002; Fan, 2014). They make use of maps, plans, photographs,
67 perspectives, models, AR, VR and other advanced digital tools for planning
68 communication and public engagement (Fan, 2014; von Petz, 2010). In urban planning
69 exhibitions the past, present, and future of a specific area or proposed development is
70 presented (Carrière & Demazière, 2002; Hein, 2015; Lu et al., 2020). Chinese UPEHs
71 are distinguished from Western examples in terms of facilitation and resourcing.
72 UPEHs in China are permanent and often very large urban exhibition spaces, that are
73 owned and resourced by the government. In contrast, most examples in other countries
74 are funded by a combination of private sector groups, public-private-partnerships,
75 NGOs, and universities, and can be either permanent, periodic or pop-up (e.g. Tewdwr-
76 Jones et al., 2020).

77

78 There are only a few studies that have been conducted around urban planning
79 exhibitions worldwide, concerning their historical development (Freestone, 2015;
80 Freestone & Amati, 2011; Hein, 2015; Nakajima, 2021; Tewdwr-Jones et al., 2020),
81 exhibition design (Tan & Cho, 2022; Lu et al., 2020; Qian & Wu, 2012), and its
82 connected political metaphors (de Jong et al., 2018).

83

84 So far, there is a gap in research on the effects of urban planning exhibitions on the
85 communication of planning contents. Hein (2015) looked into the history of urban
86 planning competitions and exhibitions and argued that they provide a way to highlight
87 breakthroughs and systemic challenges in urban planning. Some studies have explored
88 their role in user satisfaction (Bern & Røe, 2022; Fan, 2014; Tewdwr-Jones et al., 2020,
89 Tan and Cho 2022). For example, through post-visit ratings and interviews Fan (2014)
90 found that visitors were generally content with its role of communication while there
91 are limited opportunities for public participation. Tewdwr-Jones et al. (2020)
92 demonstrated that the visitor interaction board, which was used at the Newcastle City
93 Futures exhibition, received predominantly positive feedback from visitors. Nakajima
94 (2021) compared the post-visit ratings of experts and non-experts for each program
95 presented at the ‘Urbanism Places Exhibition 2018’ in Shinjuku, Japan.

96

97 These studies primarily focused on examining the effectiveness of urban planning
98 exhibitions in communication through post-visit rating. This approach provides limited
99 objective evidence and in-depth understanding of what visitors have learned. A
100 comprehensive evaluation method is therefore needed to enhance understanding of the
101 communication efficiency of urban planning exhibitions (Hall et al., 2017). Urban
102 planning exhibitions can be considered as free-choice learning settings, similar to
103 museums, science centres, and other informal educational institutions. Related to visitor
104 experience in informal learning settings, providing scientific and comprehensive

105 evidence for examining the effectiveness of urban planning communication, there exist
106 several models and theories (Kirchberg & Tröndle, 2012).

107

108 Rooted in communicative planning (Healey, 1996), and built upon Generic Learning
109 Outcomes and Contextual Model of Learning theory (Falk & Storksdieck, 2005;
110 Hooper-Greenhill, 2007), this study aims to examine the efficiency of urban planning
111 exhibitions in planning communication and the factors that may affect public learning.
112 Since UPEHs can be representative and exemplary of urban planning exhibitions
113 worldwide, particularly in relation to exhibition contents, they are ideal research
114 subjects for studying how the public perceive and experience urban planning
115 exhibitions. This research aims to answer two questions: (1) Comparing before and
116 after a visit to the urban planning exhibition hall, is the participants' knowledge about
117 urban planning improving? And, if so, (2) What factors affect knowledge acquisition
118 at the urban planning exhibition?

119

120 **2 Theoretical framework**

121 **2.1 Communicative planning theory**

122 Communicative planning, originating in the 1990s, is based on Habermasian
123 communicative rationality (Habermas, 1979) and a social constructivist paradigm. It
124 emphasizes the importance of human interactions and social processes in shaping the

125 world through planning (Healey, 2003). This approach encourages planners to adopt
126 more collaborative roles, rather than acting as disciplinary experts (Healey, 1996).
127 Throughout the communicative planning process, information should be produced
128 collectively by the full range of stakeholders who may be affected by the outcome of
129 the process. Visualisation media plays a vital role in communication (Potts, 2020). Yet,
130 in the early 1990s when the ‘communicative turn’ was proposed, visualisation media
131 were in their infancy.

132

133 Since then, a massive evolution of new technologies and tools has taken place. Planning
134 platforms on the Internet have enabled stakeholders to engage with planning issues in
135 new, consultative ways, while computer systems have revolutionized urban design
136 through virtual simulations and city models. Also, mobile technologies and social
137 media offer opportunities for increased stakeholder interaction with planners (Billger
138 et al., 2016; Eilola et al., 2023; Schroth et al., 2015).

139 -

140 Extending on communicative planning theory, this study aims to investigate the
141 effectiveness of how we communicate using contemporary visualisation media in a
142 real-world planning exhibition setting for a large audience. In prior studies, user
143 feedback collection (i.e., post-use questionnaire and interview) was a common form of
144 user experience and usability evaluation. Its reliance on user perceptions limits its
145 ability to provide objective evidence; robust and well-documented usability evaluations

146 are still lacking in the planning literature (Benyon, 2019; Eilola et al., 2023; Hall et al.,
147 2017).

148

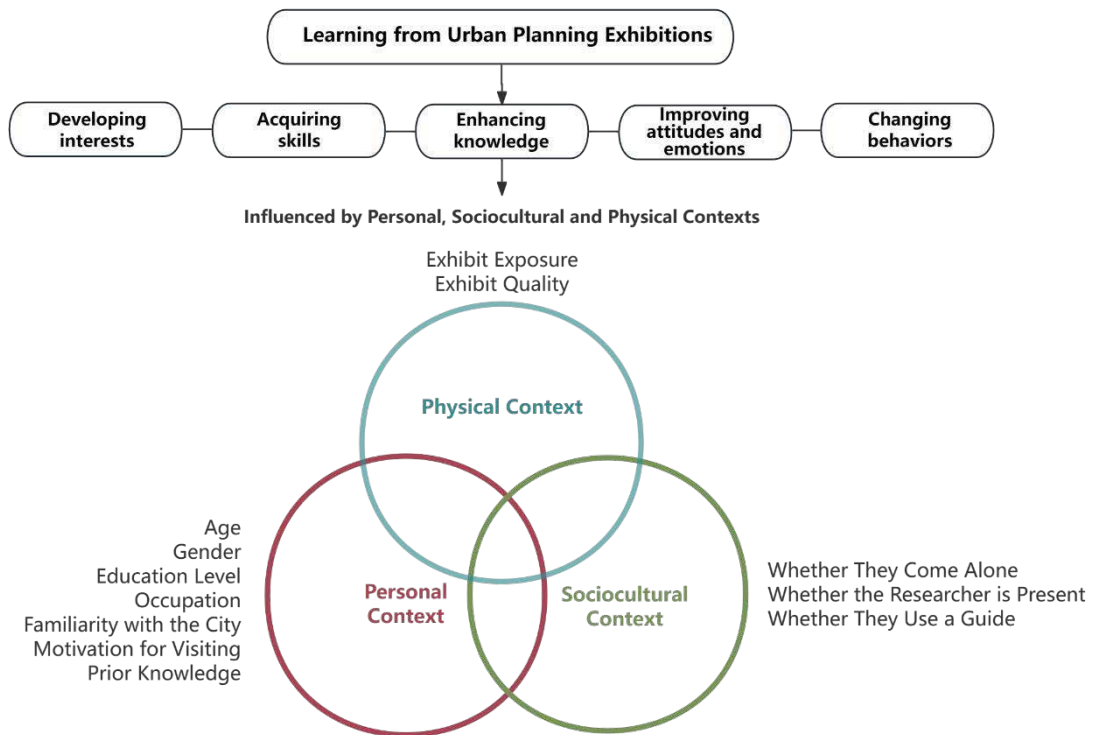
149 **2.2 Generic Learning Outcomes and Contextual Model of Learning Theory**

150 To improve the robustness of evaluating the effectiveness of communication in urban
151 planning exhibitions, this study incorporates two classical theories from museum and
152 public exhibition studies: Generic Learning Outcomes (Hooper-Greenhill, 2007) and
153 the Contextual Model of Learning (Falk & Storksdieck, 2005). Generic Learning
154 Outcomes stipulate that one's learning from informal education settings include
155 'enhancing knowledge, acquiring skills, developing interests, improving attitudes and
156 emotions, and changing behaviours' (Hooper-Greenhill, 2007). The Contextual Model
157 of Learning theory argues that informal learning is jointly shaped by one's *personal*,
158 *sociocultural* and *physical* contexts. The *personal* context refers to the personal and
159 genetic history that an individual carries with him/her to the environment; the
160 *sociocultural* context represents the social and cultural relationships that one is bonded
161 with; and the *physical* context includes both the physical setting of the exhibitions and
162 the contents (Falk & Storksdieck, 2005).

163

164 Taking into account the setting of the urban planning exhibitions, we hypothesise that
165 the following contexts can influence the communication efficiency: *personal*
166 (participants' age, gender, education level, occupation, familiarity with the city,

167 motivation for visiting, and prior knowledge of urban planning), *sociocultural* (whether
 168 participants come alone, whether the researcher is present, and whether they use a
 169 guide) and *physical* (exhibit exposure and exhibit quality) factors (see Figure 1). These
 170 were used as the theoretical framework to answer our research questions.



171
 172 Figure 1 Research framework

173 3 Materials and Methods

174 3.1 Research design

175 The overall goal of this study was to investigate changes in participants' knowledge of
 176 urban planning after visiting the UPEHs, as well as the factors that influenced those
 177 changes. This study adopted a repeated measures design method based on Hooper-
 178 Greenhill (2007), Falk and Storcksdieck (2005), and Bitgood et al. (1988). As shown in
 179 Table 1, participants were classified into two groups at random: The experimental

180 (Group A) and the control group (Group B). The experimental group received
 181 questionnaires pre- and post-visit and were unobtrusively observed during their visit.
 182 The control group filled out questionnaires before and after visiting the exhibition,
 183 without the researcher’s presence (explained in Section 2.4). This research design offers
 184 three advantages: First, to eliminate a potential bias of the researcher’s presence;
 185 second, to examine the *physical* variables that participants spent with the UPEH; and
 186 third, to save time for the researcher.

187

188 Table 1 Research Design

Group number	Before visiting	During visiting	After visiting
Group A	Questionnaire	Unobtrusive observation	Questionnaire
Experimental group	1. Personal info 2. Self-assessment 3. Structured questions 4. Open-ended questions	1. Overall time 2. Time spent with particular exhibit 3. Interaction with others	1. Re-evaluate self-assessment 2. Revise structured questions 3. Revise open-ended questions
Group B	Questionnaire	NA	Questionnaire
Control group	1. Personal info 2. Self-assessment 3. Structured questions 4. Open-ended questions		1. Re-evaluate self-assessment 2. Revise structured questions 3. Revise open-ended questions

189 **3.2 Research setting**

190 The authors paid visits to all UPEHs in the Pearl River Delta, including Guangzhou,
 191 Dongguan, Hongkong, Nansha, Shenzhen, and Macau (Figure 2). The UPEHs were
 192 examined using predefined criteria (Table 2), including opening year, floor area, media
 193 richness, social impact, and permission to conduct the research. The Guangzhou Urban

194 Planning Exhibition Hall (UPEH) was chosen for its representativeness of broader
 195 UPEHs and its ability to accommodate the research.



196
 197 Figure 2 Examples of UPEHs in the Pearl River Delta

198 Left: Foshan UPEH; Top centre: Hongkong City Gallery; Centre: Nansha Pearl Bay
 199 Exhibition Hall; Bottom centre: Dongguan UPEH; Top right: Shenzhen Bao'an District
 200 Urban Planning Exhibition Hall; Centre right: Shenzhen Museum of Contemporary Art
 201 & Planning Exhibition; Bottom right: Guangzhou UPEH.

202 Source: produced by the authors

203 Table 2 Predefined examination sheet of UPEHs in the Pearl River Delta

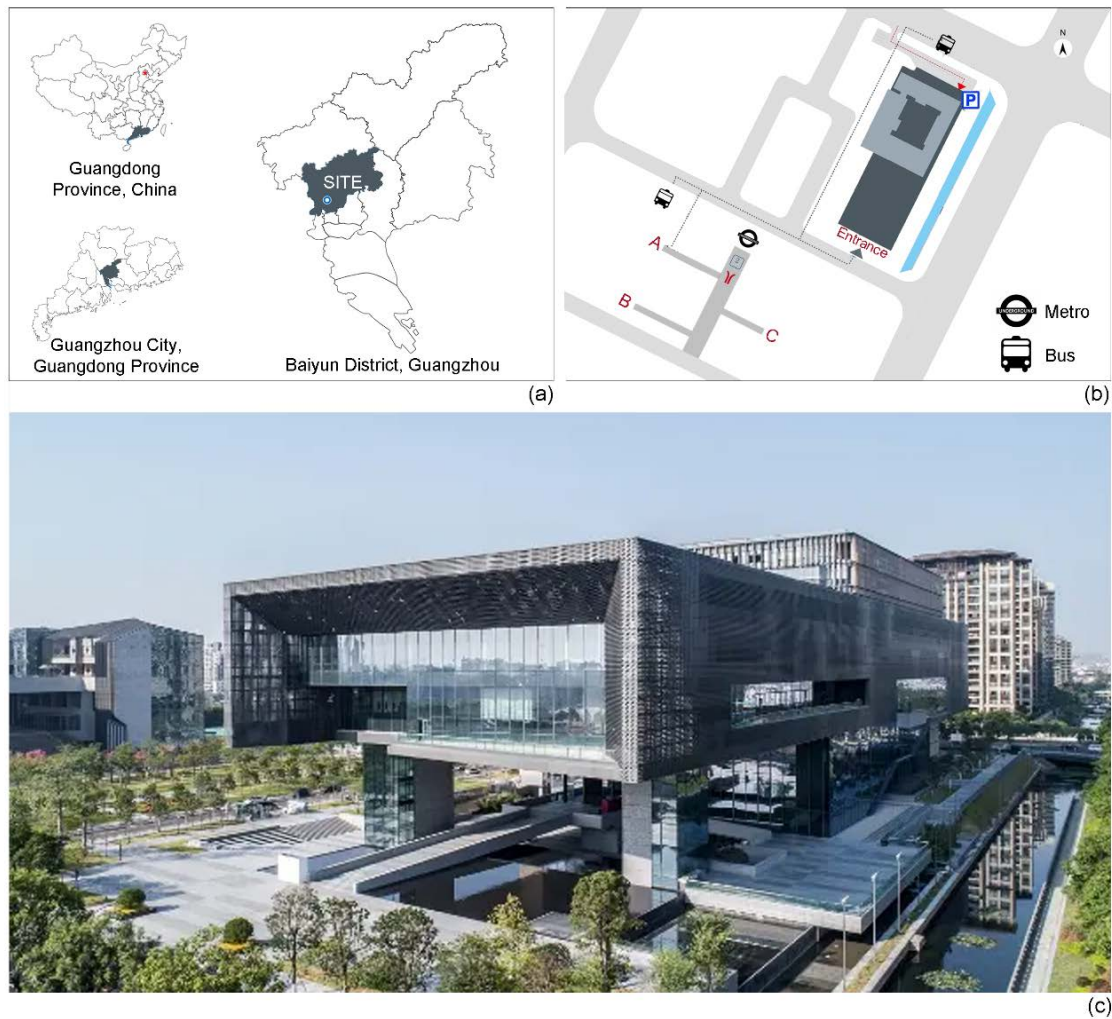
City	Name	Year of opening	Floor space (m ²)	Media richness	Social impact	Permission for research
Dongguan	Dongguan Urban Planning Exhibition Hall	2017	15000	***	**	**
Foshan	Foshan Urban Planning Exhibition Hall	2019	20000	***	***	**
Guangzhou	Guangzhou Urban Planning Exhibition Hall	2018	84000	***	***	***
	Nansha Pearl Bay Exhibition Hall	2016	3800	**	*	*
Hongkong	Hongkong City Gallery	2012	3000	**	**	**
Shenzhen	The Museum of Contemporary Art & Planning Exhibition	2020	88185	***	***	*

City	Name	Year of opening	Floor space (m ²)	Media richness	Social impact	Permission for research
Shenzhen	Bao'an District Urban Planning Exhibition Hall	2016	5300	**	*	**
Zhuhai	Zhuhai Hengqin Urban Planning Exhibition Hall	2012	22242	**	*	*

204 Note: '*' to '***' resembles a better performance in that genre according to onsite visit
205 by the authors and UPEH brochures

206

207 Guangzhou UPEH is located in the provincial capital of Guangdong, the political centre
208 of the Pearl River Delta. The UPEH provides convenient road, subway and pedestrian
209 access (Figure 3). It was opened to the public in 2017; it is free of charge and attracts
210 about 300, 000 visitors yearly. The Guangzhou UPEH possesses an exhibition area of
211 30, 000 m² (which is more than four full size football pitches) with 119 sets of planning
212 exhibits on three floors (see Supplementary materials I and II for floor maps and
213 exhibition catalogues). The exhibition includes 8 themes: (1) Urban development and
214 layout, (2) Future planning, (3) Economy and geography, (4) Landscape and
215 environment, (5) History and culture, (6) Historical preservation of ancient buildings
216 and districts, (7) Transportation, and (8) Utilities (Lu, 2021).



217

218 Figure 3 The Guangzhou UPEH

219 (a) Location of the Guangzhou UPEH; (b) Transportation and accessibility; (c) the
 220 Guangzhou UPEH

221 Source: (a) (b) produced by the authors and (c) online source by the architects from
 222 South China University of Technology

223 3.3 Sampling method

224 The research was conducted between October 8th and December 7th, 2019. The
 225 selection of participants was intended to be impartial and typical of Guangzhou UPEH
 226 visiting groups. Building on Falk and Storksdieck (2005), one adult out of every fifth

227 group of visitors that entered the UPEH entrance was approached and invited to
228 participate in the experiment. Participants could consist of one or more individuals,
229 only adults or adults with children. Overall, a non-biased sample of 115 adult visitors
230 participated in this study, thus achieving to capture approximately 15 % of the daily
231 flow, which can effectively represent the general visitor group (Conroy, 2018).

232

233 At the beginning the researcher provided a general overview of this study to the
234 participants. They were informed that their participation would be voluntary and that
235 they could withdraw from the experiment at any time. Those who agreed to participate
236 were asked to sign a consent form and were given further instruction on how to proceed.
237 To avoid ‘demand bias’ (Orne, 2009), in which participants may guess the research
238 objectives and state that their knowledge level has increased or that they purposefully
239 extended their visit, the researcher did not explicitly state that they would be asked to
240 answer the same question again, but rather stated that they would be asked some
241 questions after their visits. Following this process, participants were assigned to the
242 experiment group (n = 55) and control group (n = 60) at random. Their *personal*
243 information is listed in Table 3.

244

245 **Table 3 Personal information of participants**

Category	Division	Number	Percentage
Gender	Male	62	53.9%
	Female	53	46.1%
Age	18-34	73	63.5%
	35-54	31	27.0%
	55+	11	9.6%
Level of education	High school level or below	18	15.7%
	University level	70	60.9%
	Master's level or above	27	23.5%
Familiarity with the city	Visitors from outside Chinese mainland	4	3.5%
	Visitors from Chinese mainland	24	20.9%
	Local (stay in Guangzhou < 5 years)	23	20.0%
	Local (stay in Guangzhou >5 years)	64	55.7%
Occupation	Government official	8	7.1%
	Professionals/students in the built environment fields	16	14.2%
	Professionals/students in the media/interior field	13	11.5%
	Investor/businessman/policy-related	6	5.3%
	Others	70	61.9%
Motivation for visiting	Pursue new experience	5	4.6%
	Accompany friends and family	25	23.1%
	Learning knowledge of urban planning	36	33.3%
	A museum lover	9	8.3%
	For leisure	26	24.1%
	Others	7	6.5%
Prior knowledge	Self-assessed knowledge level of urban planning	1-5	100%
	Knowledge of factual information about urban planning	1-5	100%
	Breadth of knowledge in complex urban planning information	1-8	100%
	Depth of knowledge in complex urban planning information	1-5	100%

246 **3.4 Data collection**

247 **3.4.1 Overall strategy**

248 Building on Falk and Storksdieck (2005), Hein (2002), Hooper-Greenhill (2007)
249 Bitgood (1993) and Bitgood et al., (1988), and in consultation with UPEH staff, data
250 collection was performed before, during and after participants' visits to the Guangzhou
251 UPEH (Table 1).

252

253 Before the visit: Four different types of knowledge acquisition measurements with
254 varying complexity were used to get a comprehensive and robust understanding of
255 participants' perception (Benyon, 2019): (1) a self-evaluation of participants'
256 knowledge level of urban planning on a 5-point Likert scale; (2) nine structured
257 questions focusing on factual information about Guangzhou's urban planning; (3) an
258 open-ended test to examine participants' breadth and depth of knowledge in
259 Guangzhou's urban planning; and (4) an open-ended question to examine additional
260 learning gained from the UPEH (Hein, 2002; Hooper-Greenhill, 2007).

261

262 During the visit: Unobtrusive observation was performed during the visit for the
263 experimental group (Falk & Storksdieck, 2005). Given the exhibition's popularity,
264 enormous size and spatial layout, it was possible to maintain a sufficient distance from
265 the participant to be unobtrusive. The observer first recorded the time spent by the
266 participant at each exhibit, then documented their apparent interaction with others (e.g.,

267 determining the focus of their attention or observing whether specific members of the
268 party appeared to be leading the tour). Then, the level of interaction within the social
269 group and with UPEH guides outside the group was recorded. Finally, the total duration
270 of the visit (excluding entry and post-visit interviews) was recorded (Boisvert & Slez,
271 1994; Falk & Storksdieck, 2005).

272

273 After the visit: The questionnaire filled out by participants before their visit was shown
274 to them again. They were asked to re-assess their knowledge level of urban planning,
275 edit their responses to the structured questions if needed, complement their answers to
276 the open-ended test and describe any additional learning experiences they had
277 throughout the UPEH visit.

278

279 **3.4.2 Development of measurements**

280 **3.4.2.1 Dependent variables**

281 The dependent variable in this study is participants' learning from the UPEH, measured
282 using a combination of self-assessment, structured and open-ended questions (see
283 supplementary material III). For the self-assessment question, participants were
284 enquired to specify their knowledge level of urban planning using a 5-point Likert scale,
285 ranging from 'none or minimal' to 'very high'. The structured questions, which
286 consisted of nine multiple-choice questions (each with one correct answer), designed
287 in consultation with the UPEH guides, indicated public's understanding of the basics

288 of urban planning in the city. Participants were tested on their knowledge of
289 Guangzhou's historical layout, their ability to identify the city's most famous
290 landmarks, their understanding of historical sites, and their comprehension of urban
291 spatial strategic planning and the development of its transportation system (Sanchez &
292 Afzalan, 2018).

293

294 The first open-ended question was intended to measure whether participants had a
295 broad and extensive knowledge of urban planning in Guangzhou: 'Tell me everything
296 you know about Guangzhou's history, present and future in terms of urban planning.'
297 For further clarification this statement was added: 'Think about factors such as urban
298 morphology, economic structure, landscape patterns, cultural heritage, city protection,
299 transportation system, municipal facilities, environmental protection, etc.' (Sanchez &
300 Afzalan, 2018). The second open-ended question, in accordance with GLOs (Hooper-
301 Greenhill, 2007), asked participants what they had learned during their stay at the
302 Guangzhou UPEH. These questions were followed by prompts around the dimensions
303 of skills, interests, attitudes and emotions, and behavioural aspects.

304

305 **3.4.2.2 Independent variables**

306 ***Personal variables***

307 As shown in Table 3, apart from basic socio-demographic variables including age,
308 gender, level of education, and occupation, *personal* variables were incorporated such

309 as prior knowledge and visit motivations, based on museum visitor studies (Falk &
 310 Storksdieck, 2005). Measurement of participants' prior knowledge level included both
 311 self-assessment and a pre-visit knowledge test (see Section 3.4.2.1). Building on Falk
 312 and Dierking (2005), three reasons why participants come to the UPEH were identified:
 313 learning, entertainment and social bonding.

314

315 ***Sociocultural variables***

316 In general, *sociocultural* factors can be classified into two clusters: (a) interactions
 317 within one's own social group, and (b) interactions with people from the outside, such
 318 as staff members and other visiting groups (Falk & Storksdieck, 2005). Given the visitor
 319 profiles at UPEH, the *sociocultural* variables are divided into three categories (Table
 320 4): whether the visitor was alone or in a group (e.g. with a child); whether the researcher
 321 was present during their journey through the UPEH; and whether their visit was
 322 influenced by the UPEH guide, either throughout the visit or in parts.

323 **Table 4 *Sociocultural variables of participants***

Variable	Measure	Number	Percentage
Whether they come alone	Alone	29	25.2%
	In a group without children	65	56.5%
	In a group with children	20	17.4%
Whether the researcher is present	Experiment group (Group A)	55	47.8%
	Control group (Group B)	60	52.1%
whether they use a guide	With a guide throughout the whole process	14	12.4%
	With a guide occasionally during the visit	7	6.1%
	Without a guide	92	81.5%

324 ***Physical variables***

325 We measured the physical variables of the exhibition design along two dimensions. The
326 first relates to the exhibit exposure, what has also been referred to as ‘attracting’ and
327 ‘holding’ power (Bitgood, 1993; Bitgood et al., 1988). These include the total time
328 participants spent at the UPEH and the percentage of the visited exhibits during their
329 stay.

330

331 The second dimension is concerned with the quality of the exhibit (Falk & Storksdieck,
332 2005). We asked a panel of three UPEH experts (a staff manager, a UPEH guide and
333 an urban planner) who analysed the 119 individual exhibit components within the
334 Guangzhou UPEH. Each expert rated the effectiveness of each exhibit on a scale of 1
335 (not at all) to 6 (very much) based on the following questions: Is it possible to learn
336 from the exhibit? Is the interface user-friendly, is the planning information presented
337 clearly, is the exhibit engaging, and, most importantly, will thorough engagement with
338 the exhibit help a deeper understanding of the message the curators wishes to convey?
339 These criteria were used to identify the top 10% and 25% exhibits in the UPEH.
340 Participants engagement with these top-rated exhibits were coded based on unobtrusive
341 observation techniques and documented in Table 5.

342

343 **Table 5 *Physical variables of participants***

Category	Design of exhibits	Scale
Exhibit exposure	Total time seeing exhibits in the UPEH	0.13-4.5 h
	Total number of exhibits visited	9-64
Exhibit quality	Engagement with the top 10% exhibits in the UPEH	0.01-0.89h
	Engagement with the top 25% of exhibits in the UPEH	0.06-1.34h

344 **3.5 Data analysis and results presentation**

345 Using descriptive analysis in IBM SPSS version 26.0, the *personal*, *sociocultural*, and
 346 *physical* factors were examined. The participant's self-assessment value for their level
 347 of knowledge was calculated using a 5-point Likert scale. Structured questions were
 348 graded using the predetermined responses, with one point awarded for the correct
 349 response and zero for the incorrect response. Data from the open-ended questions were
 350 transcribed from the original interview data, listed in a word document and coded in
 351 NVivo software following an inductive approach (Fereday & Muir-Cochrane, 2006).
 352 These data were aggregated into different dimensions, measured in terms of breadth
 353 and depth of answers (Falk & Storksdieck, 2005).

354

355 A sample of the measurement criteria and scoring process is provided in supplementary
 356 material IV. Specifically, the number of conceptual categories put forth by participants
 357 served as an indicator for the breadth of responses (Falk & Dierking, 2016). The scores
 358 for the breadth of answers varied from 0 to 8, reflecting the exhibition's eight non-
 359 overlapping categories. Depending on the level of sophistication and detail in the

360 responses within each conceptual category, the depth of responses was divided into six
361 levels. A score of 0–5 was used, with the scores being none, very limited, somewhat
362 limited, generally adequate, good, and excellent. The user information and scores were
363 double-checked by a research assistant using the aforementioned standard.

364

365 After participants' scores were measured, the Shapiro-Wilk test was used to see if the
366 distribution of the participants' scores across different parameters was normal. This was
367 used to investigate the differences in learning outcomes pre- and post- their visit, as
368 well as the influences on those learning changes (Field, 2013). Since the dependent
369 variables were not distributed normally, the Wilcoxon Signed Ranks test was applied
370 to investigate the mean difference of self-assessed levels and structured tests prior to
371 and following their visit. Ordinal regression was applied to investigate the influences
372 of different *personal*, *sociocultural* and *physical* factors on variations in their self-
373 assessed knowledge level and responses to structured tests (Lu, 2021). For the first
374 open-ended question, the Analysis of Covariance was utilised to distinguish mean
375 differences between different independent factors (Field, 2013). For the second open-
376 ended question, thematic analysis was applied to aggregate the different learning
377 dimensions of participants (Fereday & Muir-Cochrane, 2006; Nowell et al., 2017).

378 **4 Results**

379 **4.1 Comparing before and after a visit to the urban planning exhibition**
380 **hall, is the participants' knowledge about urban planning improving?**

381 All types of participants' knowledge tests improved significantly (Table 5). After their
382 visits to the UPEH, participants' self-reported knowledge levels (M = 2.91) were, on
383 average, 0.81 points higher than they were before (p < 0.001). After each visit, the
384 average score of the structured tests improved from 4.08 to 5.98 (p < 0.001). The first
385 open-ended question saw a substantial improvement in participants' scores, both in
386 terms of depth and breadth. The mean breadth of their scores increased from 1.37 to an
387 average of 2.55 out of eight exhibition themes in the post-visit evaluation (p < 0.001).
388 After their visit, the participants' depth of responses increased from 2.85 to 6 on average
389 (p < 0.001).

390

391 **Table 5 Participants' knowledge acquisition before and after their visit**

392

Pair Number	Content (Test items)	Before visit (Mean)	After visit (Mean)	After-Before (Mean)	Percentage change (%)
Pair 1	Self-assessed knowledge level	2.10	2.91	0.81	38.6*
Pair 2	Structured questions	4.08	5.98	1.90	46.6*
Pair 3	Breadth of knowledge	1.37	2.55	1.18	86.1*
Pair 4	Depth of knowledge	2.86	6.00	3.14	109.8*

393 ‘*’ Indicates that a significant difference is detected

394

395 Regarding participants' learning experience after the visit to the Guangzhou UPEH, the
396 NVivo coding results revealed five main categories, (1) knowledge and understanding,
397 (2) skills, (3) attitudes and values, (4) enjoyment, inspiration and creativity; and (5)
398 action, behaviour and progression.

399

400 Concerning knowledge and understanding, many participants mentioned that they
401 gained a more systematic understanding about Guangzhou's development, water
402 system and historical development (A14, A20, A26, A30, A35). Skills such as multi-
403 media presentation techniques and curatorial design strategy were also frequently
404 mentioned by participant (B26, B41).

405

406 In relation to attitudes and values, most participants were content with the Guangzhou
407 City development (A9, A12, A26, B5). Many stated that it 'has increased their sense of
408 belonging' (A29) or 'love of the city' (A32). Participants and UPEH employees (A15,
409 B11, B31) also expressed appreciation towards the physical environment of the
410 planning exhibition. As participant A15 (female, 70 years old) stated, the landscape
411 surrounding the UPEH is very beautiful, and is offering attractive viewpoints to see the
412 surrounding trees and mountains in the distance.

413

414 However, some questioned whether the city planning specifications presented would
415 be realised as planned (A37, A48, A52). For example, A48 (male, 50 years old)

416 expressed some doubts regarding the somewhat utopian future presented by the urban
417 planning exhibition, as he personally favours ‘planning representation that is backed up
418 by historical data’. Participants also provided suggestions in terms of marketing
419 promotion, exhibition design and exhibition guidance systems (A8, A17, A25, A28,
420 B29).

421

422 Concerning enjoyment, inspiration and creativity, many participants were happy to
423 undertake the visit with family members, partners or friends (A15, B18). They were
424 also feeling comfortable or content after the visit (B35). Regarding action and
425 behaviour, participants agreed that they would not only recommend the urban planning
426 exhibition to others, but would personally return for a second visit (A11, B44).
427 Observations such as the intention to ‘travel to the areas shown in the exhibits’ were
428 frequently discussed (B12).

429

430 **4.2 What factors affect knowledge acquisition at the urban planning** 431 **exhibition?**

432 *Personal* factors (including age, gender, occupation, familiarity with the city and
433 motivation for visiting) generally did not significantly affect participants’ knowledge
434 acquisition in the urban planning exhibition. Similarly, participants’ *sociocultural*
435 factors (such as whether they came alone, whether they used a guide and whether the
436 researcher was present) did not affect their learning efficiency either. Participants’ level

437 of education, prior knowledge, and *physical* factors including total length of visit, total
438 number of exhibits visited and engagement with the top-rated exhibits in the urban
439 planning exhibition, on the other hand, were significant indicators of changes in the
440 knowledge tests (see Table 6).
441

442 **Table 6 *p* value showing the influence of personal, sociocultural, and physical**
 443 **factors on public’s knowledge changes from different tests**

	Category	Change in Self-assessed knowledge level	Change in Structured Questions	Change in Breadth of knowledge	Change in Depth of knowledge
Personal	Gender	0.953	0.133	0.662	0.847
	Age	0.146	0.247	0.616	0.667
	Level of education	0.341	0.471	0.045*	0.023*
	Familiarity with the city	0.255	0.199	0.737	0.527
	Occupation	0.073	0.732	0.434	0.128
	Motivation for visiting	0.105	0.667	0.888	0.626
	Prior knowledge	0.000**	0.001**	0.261	0.000**
sociocultural	Researcher presence	0.348	0.636	0.207	0.142
	Come alone or with a group	0.678	0.710	0.596	0.087
	With guide or not	0.245	0.230	0.103	0.257
Physical	Total length of visit in the UPEH	0.136	0.000**	0.361	0.681
	Percent of total exhibits visited	0.206	0.038*	0.564	0.05*
	Engagement scores with the top 10% exhibits	0.818	0.004**	0.711	0.8
	Engagement scores with the top 25% exhibits	0.890	0.003**	0.091	0.815

444 ‘*’ Indicate that a significant difference is detected ($p < 0.05$) while ‘**’ show that a significant
 445 difference is detected ($p < 0.001$)

446

447 On factual and self-assessment questions, people with less prior knowledge
 448 significantly improved; people with a higher level of prior knowledge were associated
 449 with an increased likelihood of learning more in-depth, complex information ($\chi^2(1) =$
 450 13.988, $p < 0.001$). Participants who provided more accurate responses to the structured

451 questions were less likely to improve their factual knowledge, as evidenced by an odds
452 ratio of 0.959, $p = 0.008$. On the other hand, more time spent in the urban planning
453 exhibition was positively correlated with the probability that the structured questions
454 would get better, with an odds ratio of 5.640, $p < 0.001$.

455

456 A significant difference in mean breadth ($p = 0.045$) and depth of knowledge gain ($p =$
457 0.023) existed in relation to participants' responses to the open-ended questions after
458 their visits. Post hoc analysis using Bonferroni's test revealed that participants with
459 university-level education were more likely to gain a greater breadth of knowledge than
460 those of high school level education or below ($p = 0.043$). In relation to depth of
461 knowledge, a significant difference existed between participants educated at master's
462 level or above and at high school level or below ($p = 0.006$) and between participants
463 educated at undergraduate level and educated at master's level and above ($p = 0.017$).
464 Participants educated at master's level and above were more likely to deepen their
465 knowledge compared to those with a high school diploma or less and those with an
466 undergraduate degree.

467

468 The findings also revealed that the extent to what individuals learnt from the urban
469 planning exhibition was strongly affected by their *physical* context. Participants learned
470 more factual knowledge after a longer visit ($p < 0.01$). Participants who visited a variety
471 of exhibits were more likely to acquire more factual information ($p = 0.038$) and expand

472 their depth of knowledge ($p = 0.05$) compared to those who visited fewer exhibits. In
473 addition, people who engaged more with the top-rated exhibits also learnt more
474 compared to others who spent less time viewing the top-rated exhibits ($p < 0.01$).

475

476 **5 Discussion**

477 **5.1 Knowledge acquisition in urban planning exhibitions**

478 This research provides a comprehensive look at the role of urban planning exhibitions
479 in planning communication. Through a repeated measure design approach, visitors'
480 knowledge acquisition of urban planning improved significantly in terms of self-
481 evaluation, structured tests and open-ended questions. This supports the UPEH's role
482 for planning communication, according to the Chinese Association of Urban Planning
483 (2007). The result was consistent with Fan (2014), Tan & Cho (2022), and Nakajima
484 (2021), which discovered that visitors were pleased with the role of the urban planning
485 exhibition in communication, as evidenced by post-visit ratings. The results
486 quantitatively confirm prior studies that planning exhibitions can be used to explain
487 past history as well as systemic challenges in urban planning (Freestone, 2015;
488 Freestone & Amati, 2011), highlighting the potential of using urban planning
489 exhibitions to involve the public in urban planning.

490

491 It was found that participants' learning from urban planning exhibitions is a multi-
492 dimensional experience more than knowledge itself. These include family and
493 friendship bonding, enjoyment, inspiration and creativity, attitudes, behaviours and
494 progressions, and skills. These support the five Generic Learning Outcomes (GLOs) as
495 stipulated by Hooper-Greenhill (2007). The research also adds to previous studies on
496 the role of urban planning exhibitions including political metaphor, economic branding
497 (Fan, 2014) or exhibition layout (Qian & Wu, 2012).

498

499 **5.2 Urban planning exhibitions for inclusive planning communication**

500 In line with the findings of Falk and Dirking (2005) and Bitgood (1993) in other
501 informal learning contexts, *personal* variables including age, gender, familiarity with
502 the city, motivation, and occupation had no significant impact on knowledge
503 acquisition in the planning exhibitions. *Sociocultural* variables, including the
504 composition of the visiting group, the presence of a guide, and the presence of a
505 researcher, did not significantly influence the outcome.

506

507 However, those visitors with little knowledge about urban planning before visiting
508 showed significant improvement on factual questions and self-assessment. A higher
509 level of education was linked to a higher likelihood of increasing the depth of more
510 complex information. Broadly speaking, this implies that people with diverse
511 backgrounds visiting urban planning exhibitions can improve their knowledge about

512 planning helped by visiting such specialized exhibitions. Overall, the results indicate
513 that the urban planning exhibition, with its broad range of visualisation media and
514 planning contents, could serve as a platform for inclusive learning for the general public
515 (Lu, 2021).

516

517 **5.3 Implications for urban planning theory and regulation**

518 This study expands on Healey's (1996) communicative planning theory, which was
519 developed when communication media for public engagement were less developed
520 from a technological point of view. The study extends the Generic Learning
521 Outcomes and Contextual Model of Learning theory from museum studies to the field
522 of urban planning. The suggested theoretical framework for measuring influencing
523 factors in effective planning communication would benefit user experience and
524 evaluation studies in the planning discipline.

525

526 Some international and local planning regulations support publicizing the contents of
527 urban planning through exhibitions, e.g. as expressed in the *Regulations on public
528 announcement and publicity of urban and rural planning of the People's Republic of
529 China* (Ministry of Housing and Urban-Rural Development of the People's Republic
530 of China, 2013). Also, the *European Landscape Convention* mentions awareness-
531 raising (Council of Europe, 2004) which is further detailed in the 'Recommendation
532 CM/Rec(2008)3 of the Committee of Ministers' (Council of Europe, 2015) to

533 specifically include e.g. exhibitions, audiovisual means and simulations as a means for
534 implementing the European Landscape Convention.

535

536 The fact that urban planning exhibitions delivered knowledge effectively lays the
537 foundation for other countries to incorporate planning exhibitions as effective means of
538 public engagement into mainstream planning and governmental processes.

539

540 However, there is significant potential to raise the profile and role of urban planning
541 exhibitions in terms of communication and participation. Currently, most planning
542 exhibitions are set up in a top-down way. Expert-driven views are the basis for
543 communicating given contents of planning and design in a one-way direction. So far, a
544 possible involvement of the general public is limited to the receiving end (Fan, 2014;
545 Kochan, 2018). This may give the impression that possible future scenarios are fixed
546 expressions of planning and design, while in fact they may still be fluid (c.f. Larkham
547 and Lilley (2012). Given the urban planning exhibitions are often important strategies
548 for city branding with considerable financial investments (Denton, 2013; Ma et al.,
549 2020), rather than just having a focus on providing one-directional information, future
550 planning legislation could explore the potential of urban planning exhibitions to be used
551 in a more interactive way supporting dialogue between the experts and the public and
552 helping to improve planning and design outcomes.

553 **5.4 Implications for urban planning professionals**

554 The nature and process of learning as it occurs within the urban planning exhibition
555 context also provides guidance for how urban planning presentations can create better
556 learning environments. In this study, participants' learning was affected by the *physical*
557 context of their visit. Participants acquired a higher level of factual knowledge after
558 spending more time in the UPEH; participants who visited a greater number of exhibits
559 were able to achieve a better understanding of urban planning. In addition, participants
560 who spent more time with exhibits of higher levels of sophistication (i.e.,
561 interactiveness, design etc.) enhanced their knowledge better than others. This indicates
562 that urban planning practitioners should focus on retaining visitor attention to enhance
563 learning effects, and on maximising the variety of exhibits that are able to hold attention
564 in this way (Lu et al., 2020).

565

566 Professionals engaged in the design and communication of urban planning contents
567 should take into account the influence of physical displays and user characteristics on
568 public perceptions of urban planning, adjusting the curatorship to meet diverse needs.
569 Possible dimensions include the interactiveness of visualisation tools (Danahy, 2001;
570 Lindquist & Campbell-Arvai, 2021; Rainoldi et al., 2018), the content of planning
571 information (Lu et al., 2020), and the education level and prior knowledge of users.
572 Notably, each planning exhibition is characterised by a unique visiting pattern, with a
573 distinctive kind of movement, which is strongly influenced (though not determined) by

574 the layout of spaces and exhibits (Zhao, 2021). Future studies can further examine the
575 impact of these factors on the cognitive gains of the visitors.

576 **6 Conclusion**

577 This research was set out to examine the role of urban planning exhibitions in
578 communication. Using the case of the Guangzhou UPEH, a repeated measures design
579 approach with 115 participants was used to analyze knowledge change before and after
580 participants' visits. Results confirmed the role of planning exhibitions to enhance public
581 understanding of urban planning in a variety of knowledge forms. This research draws
582 upon the Generic Learning Outcomes and Contextual model of Learning theory,
583 quantitatively expanding on communicative planning theory in assessing the efficiency
584 of planning communication. The research shows that *personal* and *sociocultural*
585 contexts had little influence on self-assessment and factual understanding about urban
586 planning, showing the potential of incorporating planning exhibitions as an inclusive
587 learning platform for the general public. *Physical* contexts including visiting length,
588 number of exhibits seen by the participants, as well as engagement with top-rated
589 exhibits were found to significantly influence participants' learning. This calls for an
590 active and deliberate design of the planning exhibitions.

591

592 The limitation of this study lies in the following two aspects. First, sample selection.

593 As each journey can take up to 2-4 hours, it is very time-consuming to further increase

594 the number of participants. Second, this research primarily examined whether people's
595 knowledge of urban planning increased shortly after visiting urban planning exhibitions.
596 One of the primary features of short-term memory is that it is subject to temporal decay
597 or forgetting. Future studies could therefore examine the public's understanding of
598 urban planning over a longer period of time.

599

600 **Reference**

601 Benyon, D. (2019). *Designing user experience*. Pearson UK.

602 Bern, A., & Røe, P. G. (2022). Architectural competitions and public participation.

603 *Cities*, 127, 103730. <https://doi.org/10.1016/j.cities.2022.103730>

604 Billger, M., Thuvander, L., & Wästberg, B. S. (2016). In search of visualization

605 challenges: The development and implementation of visualization tools for

606 supporting dialogue in urban planning processes. *Environment and Planning B:*

607 *Urban Analytics and City Science*, 44(6), 1012–1035.

608 <https://doi.org/10.1177/0265813516657341>

609 Bitgood, S. (1993). Social influences on the visitor museum experience. *Visitor*

610 *Behavior*, 8(3), 4–5.

611 Bitgood, S., Patterson, D., & Benefield, A. (1988). Exhibit design and visitor behavior

612 empirical relationships. *Environment and Behavior*, 20(4), 474–491.

613 Boisvert, D. L., & Slez, B. J. (1994). The relationship between visitor characteristics
614 and learning-associated behaviors in a science museum discovery space. *Science*
615 *Education*, 78(2), 137–148.

616 Carrière, J.-P., & Demazière, C. (2002). Urban Planning and Flagship Development
617 Projects: Lessons from EXPO 98, Lisbon. *Planning Practice & Research*, 17(1),
618 69–79. <https://doi.org/10.1080/02697450220125096>

619 Chen, X., & Chen, R. (2017). *Pioneer of digital creative display*.
620 http://pdf.dfcfw.com/pdf/H3_AP201711200012982970_1.pdf

621 Chen, Y., Daamen, T. A., Heurkens, E. W. T. M., & Verheul, W. J. (2020).
622 Interdisciplinary and experiential learning in urban development management
623 education. *International Journal of Technology and Design Education*, 30(5),
624 919–936. <https://doi.org/10.1007/s10798-019-09541-5>

625 Chinese Association of Urban Planning. (2007). The professional committee of
626 Chinese urban planning display was formally established. *Urban Planning News*
627 *Report*, 24, 6. <http://www.cnki.com.cn/Article/CJFDTotol-CSGT200724010.htm>

628 Conroy, R. (2018). *The RCSI Sample size handbook*.
629 <https://doi.org/10.13140/RG.2.2.30497.51043>

630 Council of Europe. (2004). *European Landscape Convention*.
631 <https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/176>

632 Council of Europe. (2015). *Recommendation CM/Rec(2008)3 of the Committee of*
633 *Ministers*. <https://rm.coe.int/16802f80c9>

- 634 Danahy, J. W. (2001). Technology for dynamic viewing and peripheral vision in
635 landscape visualization. *Landscape and Urban Planning*, 54(1), 127–138.
636 [https://doi.org/10.1016/S0169-2046\(01\)00131-1](https://doi.org/10.1016/S0169-2046(01)00131-1)
- 637 de Jong, M., Chen, Y., Joss, S., Lu, H., Zhao, M., Yang, Q., & Zhang, C. (2018).
638 Explaining city branding practices in China’s three mega-city regions: The role
639 of ecological modernization. *Journal of Cleaner Production*, 179, 527–543.
640 <https://doi.org/10.1016/j.jclepro.2018.01.098>
- 641 Denton, K. A. (2013). *Museums of the Future: Municipal Urban Planning Exhibition*
642 *Halls*. University of Hawaii Press.
643 <https://doi.org/10.21313/hawaii/9780824836870.003.0012>
- 644 Eilola, S., Jaalama, K., Kangassalo, P., Nummi, P., Staffans, A., & Fagerholm, N.
645 (2023). 3D visualisations for communicative urban and landscape planning:
646 What systematic mapping of academic literature can tell us of their potential?
647 *Landscape and Urban Planning*, 234, 104716.
648 <https://doi.org/10.1016/j.landurbplan.2023.104716>
- 649 Falk, J. H., & Dierking, L. D. (2016). *The Museum Experience Revisited*. Routledge.
- 650 Falk, J. H., & Storksdieck, M. (2005). Using the contextual model of learning to
651 understand visitor learning from a science center exhibition. *Science Education*,
652 89(5), 744–778. <https://doi.org/10.1002/sci.20078>

653 Fan, P. (2014). Producing and consuming urban planning exhibition halls in
654 contemporary China. *Urban Studies*, 52(15), 2890–2905.
655 <https://doi.org/10.1177/0042098014536627>

656 Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating Rigor Using Thematic
657 Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme
658 Development. *International Journal of Qualitative Methods*, 5(1), 80–92.
659 <https://doi.org/10.1177/160940690600500107>

660 Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. SAGE.

661 Freestone, R. (2015). The exhibition as a lens for planning history. *Planning
662 Perspectives*, 30(3), 433–446. <https://doi.org/10.1080/02665433.2014.1002105>

663 Freestone, R., & Amati, M. (2011). Exhibitions and town planning culture: An
664 Australian perspective. *ITU A|Z*, 8(8), 25–39.

665 Freestone, R., & Amati, M. (2016). Town planning exhibitions. In *Exhibitions and the
666 development of modern planning culture* (pp. 17–34). Routledge.

667 Geddes, P. (1915). *Cities in evolution: an introduction to the town planning
668 movement and to the study of civics*. London, Williams.

669 Habermas, J. (1979). The Public Sphere. In P. Golding & G. Murdock (Eds.), *The
670 Political Economy of the Media: Vol. Two volume* (pp. 187–205). Edward Elgar
671 Publishing. <https://econpapers.repec.org/RePEc:elg:eebook:1077>

672 Hall, S., Oldfield, P., Mullins, B. J., Pollard, B., & Criado-Perez, C. (2017). Evidence
673 Based Practice for the Built Environment: Can Systematic Reviews Close the

674 Research - Practice Gap? *Procedia Engineering*, 180, 912–924.
675 <https://doi.org/10.1016/j.proeng.2017.04.341>

676 Healey, P. (1996). The communicative turn in planning theory and its implications for
677 spatial strategy formation. *Environment and Planning B: Planning and Design*,
678 23(2), 217–234. <https://doi.org/10.1068/b230217>

679 Healey, P. (2003). Collaborative planning in perspective. *Planning Theory*, 2(2), 101–
680 123. <https://doi.org/10.1177/14730952030022002>

681 Hein, C. (2015). Urban Planning, Competitions and Exhibitions. In *International*
682 *Encyclopedia of the Social & Behavioral Sciences: Second Edition* (pp. 882–
683 888). Elsevier Inc. <https://doi.org/10.1016/B978-0-08-097086-8.74055-4>

684 Hein, G. E. (2002). *Learning in the Museum* (1st ed.). Routledge.

685 Hooper-Greenhill, E. (2007). *Museums and education: Purpose, pedagogy,*
686 *performance*. Routledge.

687 Kirchberg, V., & Tröndle, M. (2012). Experiencing Exhibitions: A Review of Studies
688 on Visitor Experiences in Museums. *Curator: The Museum Journal*, 55(4), 435–
689 452. <https://doi.org/10.1111/j.2151-6952.2012.00167.x>

690 Kochan, D. (2018). The Prospects and Challenges of Socially Engaged Urban
691 Planning and Architecture in Contemporary China. *Journal of Planning*
692 *Education and Research*, 41(4), 477–490.
693 <https://doi.org/10.1177/0739456X18796635>

- 694 Larkham, P. J., & Lilley, K. D. (2012). Exhibiting the city: Planning ideas and public
695 involvement in wartime and early post-war Britain. *The Town Planning Review*,
696 83, 647–668.
- 697 Li, W., Feng, T., Timmermans, H. J. P., & Zhang, M. (2020). The Public's
698 Acceptance of and Intention to Use ICTs when Participating in Urban Planning
699 Processes. *Journal of Urban Technology*, 27(3), 55–73.
700 <https://doi.org/10.1080/10630732.2020.1852816>
- 701 Lindquist, M., & Campbell-Arvai, V. (2021). Co-designing vacant lots using
702 interactive 3D visualizations - Development and application of the Land.Info
703 DSS. *Landscape and Urban Planning*, 210, 104082.
704 <https://doi.org/10.1016/j.landurbplan.2021.104082>
- 705 Lu, X. (2021). *A multi-scale study of stakeholder participation and visualisation in*
706 *Chinese urban planning: The case of the Pearl River Delta*. University of
707 Sheffield.
- 708 Lu, X., Hehl-Lange, S., & Lange, E. (2020). Landscape Visualisation and Visitor
709 Perception in the Guangzhou Urban Planning Exhibition Hall. *Journal of Digital*
710 *Landscape Architecture*, 5, 330–339. <https://doi.org/10.14627/537690034>
- 711 Ma, W., de Jong, M., de Bruijne, M., & Schraven, D. (2020). Economic city branding
712 and stakeholder involvement in China: Attempt of a medium-sized city to trigger
713 industrial transformation. *Cities*, 105, 102754.
714 <https://doi.org/10.1016/j.cities.2020.102754>

715 Ministry of Housing and Urban-Rural Development of the People's Republic of
716 China. (2013). *Regulations on public announcement and publicity of urban and*
717 *rural planning of the People's Republic of China.*
718 <http://www.cxs.gov.cn/info/1562/15266.htm>

719 Nakajima, N. (2021). Designing the 2018 Urbanism places exhibition and public
720 planning history. *Planning Perspectives*, 36(1), 195–205.
721 <https://doi.org/10.1080/02665433.2020.1806724>

722 Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis:
723 Striving to meet the trustworthiness criteria. *International Journal of Qualitative*
724 *Methods*, 16(1), 1609406917733847.

725 Odendaal, N. (2012). Reality check: Planning education in the African urban century.
726 *Cities*, 29(3), 174–182. <https://doi.org/10.1016/j.cities.2011.10.001>

727 Orne, M. T. (2009). Demand characteristics and the concept of quasi-controls.
728 *Artifacts in Behavioral Research: Robert Rosenthal and Ralph L. Rosnow's*
729 *Classic Books*, 110, 110–137.

730 Potts, R. (2020). Is a new 'planning 3.0' paradigm emerging? Exploring the
731 relationship between digital technologies and planning theory and practice.
732 *Planning Theory & Practice*, 21(2), 272–289.

733 Qian, F., & Wu, G. (2012). Present Status, Development trend, And General
734 Exhibition Design Rules of Urban Planning Exhibition Halls. *Planners*, 5(28),
735 76–80.

- 736 Rainoldi, M., Neuhofer, B., & Jooss, M. (2018). *Mobile Eyetracking of Museum*
737 *Learning Experiences*. https://doi.org/10.1007/978-3-319-72923-7_36
- 738 Sanchez, T., & Afzalan, N. (2018). Mapping the Knowledge Domain of Urban
739 Planning. In *Mapping the Knowledge Domain of Urban Planning* (pp. 83–98).
740 <https://doi.org/10.4324/9781315308715>
- 741 Schroth, O., Pond, E., & Sheppard, S. R. J. (2015). Evaluating presentation formats of
742 local climate change in community planning with regard to process and
743 outcomes. *Landscape and Urban Planning, 142*, 147–158.
744 <https://doi.org/10.1016/j.landurbplan.2015.03.011>
- 745 Shilon, M., & Eizenberg, E. (2020). Critical pedagogy for the new planner: Mastering
746 an inclusive perception of ‘The Other.’ *Cities, 97*, 102500.
747 <https://doi.org/10.1016/j.cities.2019.102500>
- 748 Tan, J., & Cho, E. (2022). A Convergence Study on the Satisfaction of Visitors by
749 Exhibition Type in Chinese Urban Planning Museum. *The Korean Society of*
750 *Science, 40*(3), 447–461. <https://doi.org/10.17548/ksaf.2022.06.30.447>
- 751 Tewdwr-Jones, M., Sookhoo, D., & Freestone, R. (2020). From Geddes’ city museum
752 to Farrell’s urban room: Past, present, and future at the Newcastle city Futures
753 exhibition. *Planning Perspectives, 35*(2), 277–297.
- 754 von Petz, U. (2010). City planning exhibitions in Germany, 1910–2010. *Planning*
755 *Perspectives, 25*(3), 375–382. <https://doi.org/10.1080/02665433.2010.481189>

- 756 Wu, F. (2000). The Global and Local Dimensions of Place-making: Remaking
757 Shanghai as a World City. *Urban Studies*, 37(8), 1359–1377.
758 <https://doi.org/10.1080/00420980020080161>
- 759 Zhao, X. (2021). Testing the Contextual Model of Learning in a Chinese Context.
760 *Journal of Museum Education*, 46(2), 255–271.
761 <https://doi.org/10.1080/10598650.2021.1900680>
- 762