CHARACTERISATION AND SYSTEMATIC ASSESSMENT OF URBAN OPEN SPACES IN GLASGOW CITY CENTRE

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Urban open spaces have substantially contributed to the development of cities in terms of image, function, form, and social engagement, and thus have been a central concern of urban researchers for several decades. This paper contributes to the contemporary urban discourse as it relates to the city and its users. It demonstrates a mechanism for characterisation and systematic assessment of key urban open spaces in Glasgow City Centre. The mechanism is implemented in three layers of investigation that involve the development of space profiles through preliminary observations, an examination of functional, social, and perceptual attributes through a walking tour assessment procedure with checklists and a scoring system, and an understanding of how users perceive and comprehend these spaces through a photographic attitude survey. The paper places emphasis on key findings by conveying similarities and differences between the spaces in terms of assessment outcomes and users' perception, while revealing their essential attributes and qualities. Conclusions are offered as reflections on the findings while suggesting possibilities for future research through additional complementary layers of investigation.

Key words: urban open space, walking tour assessment, users perception, urban space attributes, Glasgow.

INTRODUCTION: ON THE QUALITIES OF URBAN OPEN SPACES

Urban open spaces are an integral component of urban structures and represent the lung of the city where people enjoy, entertain, and interact. The spatial configuration and urban form play a major role in generating urban life and human exchange (Moughtin and Mertens, 2003), and thus enable the integration of routines of work, communal life, enjoyment and, relaxation. Urban open spaces support human needs and convey cultural and contextual meanings within the essential qualities of accessibility and proximity to important structures within the city (Carr *et al.*, 1992).

Urban research divulges various important qualities that should be satisfied. Carmona *et al.*, (2010) consider comfort, relaxation, and active and passive engagement with the environment as primary needs that people seek to satisfy in public spaces. The sense of comfort is merely reflected by the length of time that people stay in a public space. The richness of architectural vocabulary and the human scale of space play a key role in enhancing the sense of relaxation. As the sense of comfort and relaxation are increased, the feeling

of safety and security are supported (Carr *et al.*, 1992). The variety of landscape elements and the spatial subdivisions of public space help accentuate the positive contrast with the adjacent surroundings and make it easier for the users to relax.

Architectural qualities that ensue from responses to climatic conditions, availability of materials and techniques, and the socio-cultural context are important to consider. Rapoport (1976) postulates that the lifestyle of any specific community is recognised as the interactive relationship between cultural, material, spiritual and social aspects, which are varied from one place to another. Spreiregen (1965) points out that the urban form of a city or town is generated through its population 'size', which is linked to the physical outline structure 'shape', in order to produce and qualify the geometry of city form 'pattern'. As a result, the intensity of using land by people and buildings 'density' play a vital role in developing and redeveloping these elements. In other words, *density is determined by urban texture and grain* and expresses *the degree of homogeneity or heterogeneity of use by people or buildings* (Spreiregen, 1965:64). The propositions of Rapoport and Spreiregen epitomize a case for the value of understanding physical as well as social and perceptual dimensions of the environment.

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The sense of 'individuality within collectiveness' is another important quality that satisfies needs of users and is typically enabled by a clear distinctiveness of an urban space, which facilitates diversity of perceptions and emotional responses (Salama and Gharib, 2012). Conspicuously, clear boundaries and appropriate proportions of built forms that consider human scale are critical factors for maintaining this quality. In essence, social activities that take place in an urban open space mandate an understanding of how people perceive it and the way in which they comprehend the significance of its visual and aesthetic qualities (Moughtin and Mertens, 2003). A general agreement in the literature corroborates that a vibrant city is a matter of the density of pedestrian movement, quality of public spaces, and diversity of uses (Buchanan, 1963; Barnett, 1983; Schumacher, 1986; Jacobs, 1993).

The preceding discussion suggests that studying how the urban spaces are used continues to be pivotal in interpreting the relationship between users and their surroundings. Therefore, this paper addresses the significance and methods of obtaining information on the experience, use, and perception by demonstrating a mechanism for characterisation and systematic assessment of nine urban open spaces in Glasgow City Centre. Methodologically, the mechanism is implemented in three layers of investigation that involve the development of space profiles through preliminary observations, an examination of functional, social and perceptual attributes through a walking tour assessment procedure with checklists and a scoring system, and an understanding of how users perceive and comprehend these spaces through a photographic attitude survey. Such a mechanism enables a profound insight into the understanding of the essential characteristics of urban open spaces.

THE CONTEXT OF THE STUDY: GLASGOW CITY CENTRE

The City Centre of Glasgow can be understood within three main stages of development: The Medieval City, the Merchant City, and Blythswood. The medieval stage began in the 12th century with the centre fully established by the 16th century (McKean *et al.*, 1989). The only remaining edifice is the medieval Cathedral that has prime importance to the city (Williamson *et al.*, 1990). The second stage was the planned 'New Town' known as the 'Merchant City', which commenced in 1786. This stage brought wide gridiron streets that contrasted the spontaneous medieval settlement pattern. The third stage was Blythswood in 1830 and displayed clear gridiron streets and squares, which were an expansion of the Merchant City.

While discussing the detailed urban evolution of Glasgow City Centre goes beyond the scope of this study, it should be noted that during the 19th century the city was known as the 'second city of the British Empire'. During this time Glasgow witnessed rapid growth in terms of population and urban expansion (McKean *et al.*, 1989). This period was characterised by magnificent Victorian buildings and urban spaces, which continue to shape the character of modern Glasgow. Conversely, during the 1930s, the prosperity of the city declined dramatically where, for decades, the city was portrayed as an unsafe city, with rumours of razor

gangs' itinerant through the streets (Stewart, 1997). In recent years Glasgow has initiated to its new role as a post-industrial European city and has become a vibrant hub for trade, education, culture, and arts. Despite urban sprawl, social segregation, and car dependency (Frey, 1999) the city displays a great deal of spatial and formal consistency, which makes it a thought-provoking place for urban exploration.

A MECHANISM FOR CHARACTERISATION AND ASSESSMENT OF URBAN OPEN SPACES

Nine urban open spaces are selected to examine their qualities. The selection is based on a combination of squares and streets (Figure 1). The urban squares include George Square, which represents the civic heart of the city, whereas Royal Exchange Square and St. Enoch Square are considered the most important spaces within Merchant City. The Royal Exchange Square accommodates Gallery of Modern Art, GOMA. Included in the study is St. Andrews Square, which is regarded as the first pre-planned square along the initial street (High Street). Additionally, the Central Bus Station Square is a vital urban place that links one of the most active areas in the city (Central Bus Station) with the surrounding urban context. While selecting urban streets such as Argyle Street, Sauchiehall Street and Buchanan Galleries is due to their location along the city's 'Golden Z', the Clyde Street is included in the study based on its position that represents an interface between the edge of the centre and the River Clyde (Figures 1 & 2). The mechanism for characterisation and assessment involves three layers of investigation as discussed hereunder.
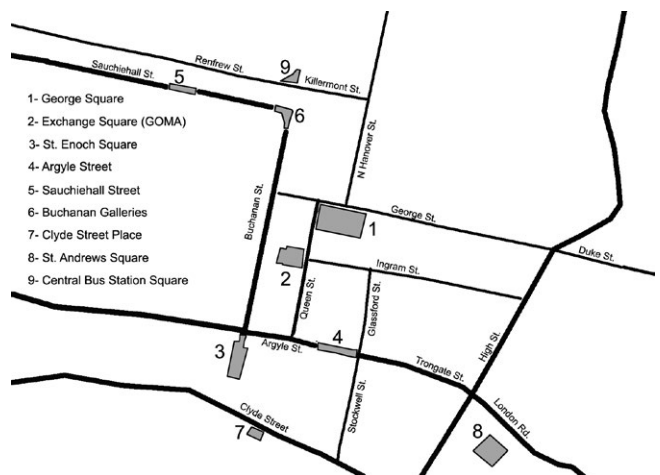

Figure 1. The location of the nine selected urban open spaces in Glasgow City Centre

Development of Space Profiles

The first layer includes the development of space profiles or portfolios for each of the selected spaces based on preliminary observations. As a procedure, it encompasses categorization of spaces in terms of spatial typology, architectural patterns, accessibility, activities and use, and user types. Each category incorporates a number of parameters that enable effective classification.

A Walking Tour Assessment Procedure

Following earlier scholarly explorations conducted in other contexts (Salama and Azzali, 2015), the second layer of
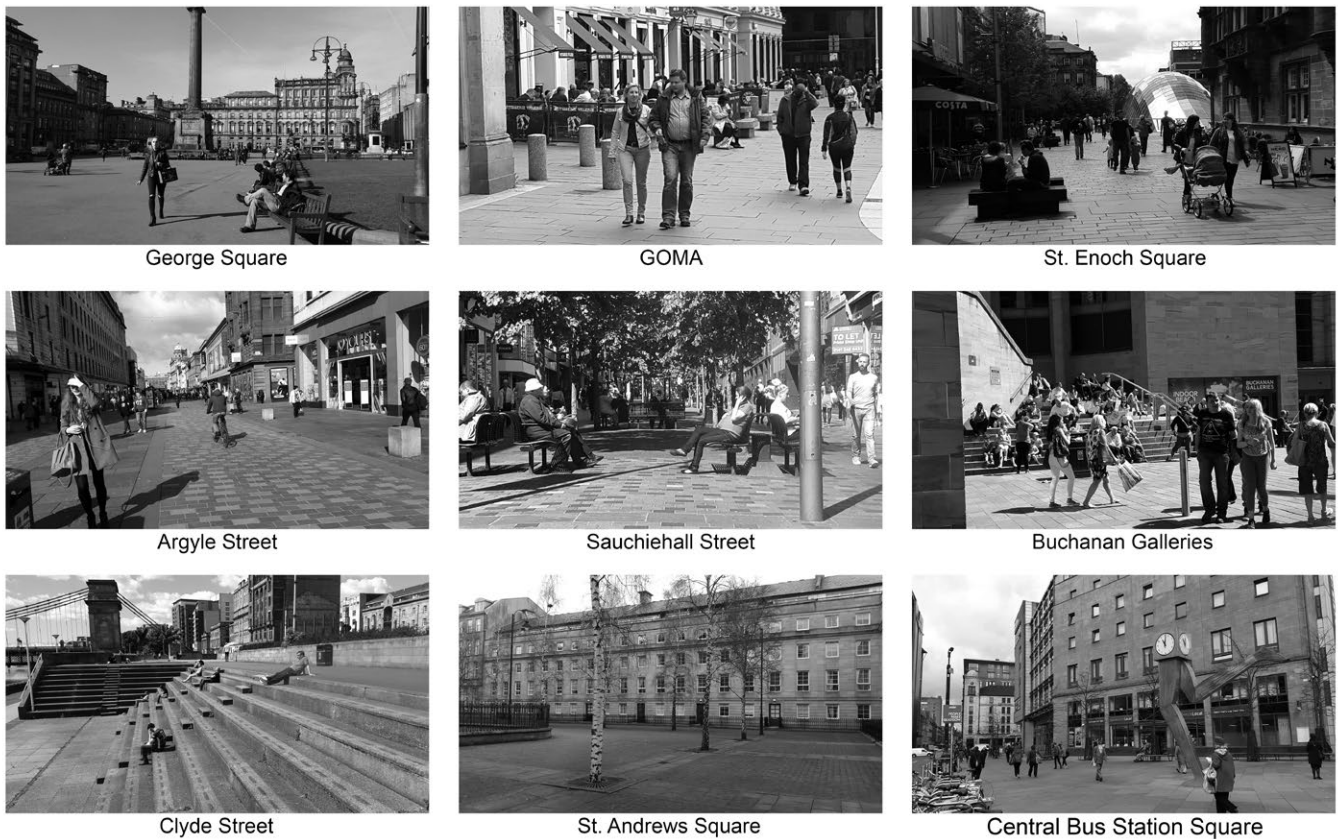
Figure 2. Nine urban open spaces identified for characterisation and assessment

investigation includes an examination of functional, social, and perceptual attributes through a walking tour assessment procedure designed to facilitate a deeper understanding of urban spaces in Glasgow City Centre. To this end, a tool is devised in terms of three checklists underlying three major sets of attributes namely: functional, social and perceptual. Each set of attributes includes 12 factors with a scoring system and a four-point scale, where scores are assigned against each factor in terms of degree of appropriateness (Figure 3). Scores are then averaged to reach a collective score for each set of attributes. The total 36 factors stem from urban literature and are developed to reflect the quality of an urban space underlying the three sets as follows:

• *Functional Attributes:*

Variety of uses; ecological quality; formal quality; accessibility; space subdivision; legibility; definition; richness of visual experience; richness and diversity of landscape elements; robustness and adaptability; proximity and continuity; and spatial quality.

• *Social Attributes:*

Sense of interaction; inclusivity; diversity of age groups; diversity of activities; ethnic diversity, efficiency of use, functionality; reachability; accessibility for users with special needs; human scale, and harmony.

• *Perceptual Attributes:*

Suitability and desirability; relaxation and comfort; human needs for regular use; safety and security; memory; cultural diversity; attractiveness; noise acceptability; identity and history; distinction and recognition; night engagement, and density of users.

It is recognized that some factors underlying one set of attributes may overlap with factors underlying another. In essence, this ensures a process of verification; that if one factor is misinterpreted in the scoring of one set, such a misinterpretation could be corrected when assessing a similar one under another set.

Users Perception: Photographic Attitude Survey

Research for examining the reciprocal relationship of people and urban environments continues to emphasise that the spatial quality of the surrounding context affect immediate experience and influence subsequent reactions to both the setting and its users (Cho *et al.*, 2016; Cojuharencoa *et al.*, 2016; Francis *et al.*, 2012; Holland *et al.*, 2007; Lang, 1987). Assessing human experience of different urban open spaces of the same urban context provides a substantial understanding of the values and significance of these spaces to their users (Lindal and Hartig, 2013; Nasar, 1988; Rapoport, 1982; Ratcliffe and Korpela, 2016; Ruddick, 1996; Sanoff, 1991). Therefore, the third layer of investigation is developed to provide an understanding of users perception of the selected spaces by utilising a photographic attitude survey where users are asked to respond to the images of each space using polar adjectives that best describe them. The attitude survey includes questions that enable the identification of spaces that are most liked, most visited, most passed-by, as well as spaces that represent the city (Figure 4). While the aim is not to generalise the outcomes of the survey, the 35 responses received offer an indication of the qualities of these spaces based on the respondents' relative experience of the city centre and its various spaces.

Functional Aspects

	Score
Highly Appropriate 4 3 2 1 Highly Inappropriate	A1 A2 A3

1- To what degree does the space involve different uses? (**Variety of Uses**)	
2- To what degree could the design of this space be described as environmentally responsive? (**Ecological Quality**)	
3- To what extent is the form of the space appropriate for the existing uses? (**Formal Quality**)	
4- To what extent is this space accessible from the surrounding urban context? (**Accessibility**)	
5- To what degree does this space include multiple gathering settings? (**Space Subdivision**)	
6- To what degree does this space include iconic elements that make it unique and probably visible from a distance? (**Legibility**)	
7- To what degree does this space have clear boundaries/edges? (**Definition**)	
8- How would you rate the quality of architectural vocabulary in this space? (**Richness of Visual Experience**)	
9- How would you rate the quality of landscape elements in this space? (**Richness and Variety of Landscape Elements**)	
10- To what degree does the design of space can be adapted and modified according to emerging needs and requires? (**Robustness & Resilience/Adaptability**)	
11- To what degree is this space essential to the surrounding urban context? (**Proximity & Continuity / Need**)	
12- To what extent are the buildings adjacent to the space compatible to one another and to the configuration of the space? (**Spatial Quality**)	
Average Score (total scores/12) Combined Average Score	

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Figure 3. Sample sheet used in the walking tour assessment procedure

University of **Strathclyde**

Perception of Urban Open Spaces in the City of Glasgow -------------------------

- Name ....(optional)
- Gender............ Male ....Female
- Age (-16) (16-25) (26-35) (36-45) (+46)
- Country of Origin / Cultural Background ....

The nine images represent selected urban spaces in Glasgow City Centre. Look at each of the images and consider which of the paired adjectives better describe it. Check the box closest to the more appropriate adjective in each line. If you think neither adjective applies, check the box in the middle.

- Out of nine, select three spaces that you like the most (in order) _____ _____ _____
- Out of nine, select three spaces that you think represent the city of Glasgow _____ _____ _____
- Out of nine, select three spaces that you visit most for different purposes _____ _____ _____
- Out of nine, select three spaces that you pass by the most _____ _____ _____

George Square	**Gallery of Modern Art**	**St. Enoch Square**

George Square			Gallery of Modern Art			St. Enoch Square		
Urban	....	.... Peripheral	Urban	....	.... Peripheral	Urban	....	.... Peripheral
Vibrant	....	.... Boring	Vibrant	....	.... Boring	Vibrant	....	.... Boring
Inviting	....	.... Uninviting	Inviting	....	.... Uninviting	Inviting	....	.... Uninviting
Unusual	....	.... Humble	Unusual	....	.... Humble	Unusual	....	.... Humble
Complex	....	.... Simple	Complex	....	.... Simple	Complex	....	.... Simple
Indistinguishable	....	.... Distinctive	Indistinguishable	....	.... Distinctive	Indistinguishable	....	.... Distinctive
Familiar	....	.... Unfamiliar	Familiar	....	.... Unfamiliar	Familiar	....	.... Unfamiliar
Restful	....	.... Stressful	Restful	....	.... Stressful	Restful	....	.... Stressful
Inspiring	....	.... Uninspiring	Inspiring	....	.... Uninspiring	Inspiring	....	.... Uninspiring
Pleasing	....	.... Unpleasing	Pleasing	....	.... Unpleasing	Pleasing	....	.... Unpleasing
Iconic	....	.... Ordinary	Iconic	....	.... Ordinary	Iconic	....	.... Ordinary

Figure 4. Sample sheet utilised in the photographic attitude survey for examining users perception

DISCUSSION OF KEY FINDINGS OF CHARACTERISATION AND ASSESSMENT PROCEDURES

The selection process resulted in identifying nine urban open spaces that can be examined as part of this assessment. The selection was based on a preliminary understanding of their importance and performance. While the vibrancy and use of the spaces vary substantially, the combined qualities of the nine spaces demonstrate various characteristics that include diversity of activities, entertainment and relaxing opportunities that generate social cohesion within the city centre.

Generic Characteristics

Repeated visits to the nine spaces at different days and times were an important procedure to record preliminary observations and resulted in establishing descriptive profiles for each. This involves an introductory examination of the spatial typology, architectural pattern, contextual accessibility, the nature and type of activities undertaken by the users, and the type of users (Table 1). The underlying parameters were examined in terms of clear availability or presence, moderate availability, and no availability. It is clearly evident that key parameters are absent from some spaces, i.e. lack of street furniture and signage, lack of children facilities, or poor accessibility with respect to users with special needs.

Functional Attributes

Attributes that represent the functional quality of urban spaces appear to be highly appropriate scoring a total average value of 3.04. This can be attributed to three urban spaces scoring high, namely St. Enoch Square (3.6), George Square (3.42), and Central Bus Station Square (3.30). Four spaces appear to be similar in functional performance scoring similar or identical scores, namely Sauchiehall Street (3.2), Buchanan Galleries (3.2), GOMA Square (2.88), and Argyle Street (2.81). Notably, St. Andrews Square and Clyde Street appear to have lower functional performance scoring 2.70 and 2.30 respectively (Table 2).

Evidently, higher scores in terms of appropriateness were found in urban squares rather than in urban streets. This is palpable in the scores where urban squares score as highly appropriate in seven of the twelve attributes, which are: ecological quality, space subdivision, legibility, richness of visual experience, richness and variety of landscape elements, adaptability, and spatial quality. However, urban squares and streets received similar scores in terms of formal quality, accessibility, definition, and proximity and continuity. In addition, urban streets appear to be more appropriate than urban squares in terms of the variety of use due to the strong presence of commercial activities within streets. In addition, five of the functional attributes play a principal role in both urban squares and urban streets including clear boundaries and definition, significance to the urban context, appropriateness for the surrounding uses, accessibility, and the way in which the spaces accommodate iconic elements that make the urban space unique and possibly visible from a distance.

Table 1. Comparative analysis of the profiles of the nine urban open spaces in Glasgow City Centre

Categories and Parameters / Space Name	Spatial Typology					Architectural Pattern					Accessibility					Activities/Use				Users Types					
	Green Spaces / Landscape Elements	Pedestrian Paths	Street Furniture and Signage	Tidiness and Character	Enclosure and Diversity of Settings	Outstanding Buildings	Harmony in Geometrical Massing	Identity -- Architectural Language	Richness of Building Materials	Uniqueness of Architectural Vocabulary	Easy to Access for Diverse Age Groups	Close and Important to the surroundings	Ease of identification	Reachable and Navigable	Ease of Access for Spatial Need Users	Leisure and Entertainment	Walking & Relaxing	Family Facilities	Children Facilities	Commercial	Children	Adults	Singles	Families and Groups	Diversity -- Ethnicity
George Square	■	■	■	■	▨	■	■	■	■	■	■	■	■	■	□	■	■	□	□	■	■	■	■	■	■
Exchange Square/GOMA	□	■	■	■	■	■	■	■	■	■	■	■	▨	■	□	■	■	□	□	■	□	■	■	■	■
St. Enoch Square	■	■	■	■	■	■	■	■	■	■	■	■	■	■	□	■	■	□	□	■	■	■	■	■	■
Argyle Street	■	■	■	□	□	■	■	■	■	■	■	■	■	■	▨	■	■	□	□	■	□	■	■	■	■
Sauchiehall Street	■	■	■	■	□	■	■	■	■	■	■	■	■	■	□	■	■	□	□	■	■	■	■	■	■
Buchanan Galleries	■	■	■	■	□	■	■	■	■	■	■	■	■	■	□	■	□	□	□	■	■	■	■	■	■
Clyde Street	■	■	■	▨	□	■	■	■	■	■	□	■	■	■	□	■	■	□	□	■	□	■	■	■	■
St Andrews Square	▨	■	□	■	□	■	■	■	■	■	■	■	■	■	▨	□	■	□	□	■	■	■	■	■	■
Central Bus Station Square	■	■	■	■	■	■	▨	■	▨	■	■	■	■	■	▨	■	■	□	□	■	■	■	■	■	■

Legend: ■ Clear availability or presence ▨ Moderate availability or presence □ No availability or presence

Table 2. Outcomes of assessing the functional attributes of the selected urban open spaces

Functional Attributes	Variety of Uses	Ecological Quality	Formal Quality	Accessibility	Space Subdivision	Legibility	Definition	Richness of Visual Experience	Richness & variety of Landscape elements	obustness & Resilience/ Adaptability	Proximity & Continuity/ Need	Spatial Quality	Total Average/space
George Square	2.00	3.75	3.50	2.75	3.00	3.75	3.75	3.75	3.25	4.00	4.00	3.50	**3.42**
Exchange Square/GOMA	3.00	1.25	3.00	3.25	3.25	3.00	3.75	3.00	2.00	2.50	3.50	3.00	**2.88**
St. Enoch Square	4.00	3.25	3.75	4.00	3.50	3.75	3.75	3.50	3.50	3.50	3.75	3.75	**3.60**
Argyle Street	3.50	1.50	3.50	4.00	2.50	1.25	3.75	1.50	2.50	3.00	4.00	2.75	**2.81**
Sauchiehall Street	4.00	3.25	4.00	4.00	3.00	2.00	3.25	2.75	3.00	3.00	4.00	2.50	**3.20**
Buchanan Galleries	3.75	2.25	3.25	3.25	3.50	3.50	3.00	3.25	2.75	3.00	3.75	3.25	**3.20**
Clyde Street	1.25	2.50	2.75	2.25	2.25	3.00	3.00	2.00	2.75	2.00	2.00	2.00	**2.30**
St Andrews Square	1.00	3.00	3.25	2.25	2.25	3.50	4.00	3.25	2.25	3.00	1.50	3.25	**2.70**
Central Bus Station Square	3.75	3.00	3.00	3.50	3.75	3.75	3.25	3.25	3.00	3.00	3.25	3.00	**3.30**
Overall Assessment	**2.92**	**2.64**	**3.33**	**3.25**	**3.00**	**3.05**	**3.50**	**2.92**	**2.78**	**3.00**	**3.31**	**3.00**	**3.04**

≤ 1.00 (Highly Inappropriate)		> 1.00 – 2.00 (Inappropriate)		> 2.00 – 3.00 (Appropriate)		> 3.00 Highly Appropriate	

When making comparison two urban spaces that have similar physical form and historical structures such as St. Andrews Square and GOMA Square the assessment procedure discloses interesting results. Although the former achieved high scores in eight of the functional attributes and the latter achieved high scores only in four of the twelve attributes, the assessment scores of St. Andrews Square is only 2.70 and of GOMA Square is 2.81. Palpably, GOMA Square is vibrant in terms of city life while no urban life exists in St. Andrews Square. This demonstrates that functional attributes such as the variety of uses, accessibility, space subdivision, and proximity and continuity, contribute the most in attracting people and in increasing the usability of urban spaces (Figure 5).

Sauchiehall, Argyle and Buchanan Streets form an essential part of the city centre of Glasgow, the city's Golden Z, where most of the pedestrian activities take place. The city life is robustly generated by the diversity of functions along pedestrianized pathways, which also provide a suave accessibility, valuable spatial quality, and richness of visual experience. Likewise, it is clear that GOMA and George Squares enjoy proximity to the city's Golden Z,

accommodating a high level of daily vibrancy, irrespective of rather limited diversity of uses. This provides evidence that formal quality, space subdivision, legibility, definition and adaptability are important attributes that characterise the two spaces and are substantial factors that enhance city life.

Social Attributes

The assessment of social attributes reveals that urban spaces combined appear to be highly appropriate scoring a total average score of 3.07 (Table 3). Principally, this stem from the qualities of four urban spaces, scoring as highly appropriate: Sauchiehall Street (3.73), St. Enoch Square (3.5), Central Bus Station Square (3.50), and Argyle Street (3.29). George Square, Buchanan Galleries, and GOMA Square scored relatively high: 3.04, 3.19, and 3.08 respectively. However, the total average scores were fairly lower for Clyde Street (2.15) and St. Andrews Square (2.13).

Primarily, urban streets and urban squares are appropriate for social interaction within the city centre of Glasgow though urban streets maintain relatively higher scores over urban squares in terms of functionality, sense of interaction, and human scale. Urban streets and squares are reachable

St. Andrews Square

GOMA Square

Figure 5. Diversity of land use and city life in similar urban form and historical structures

from the surrounding urban context and naturally provide good accessibility for the majority of user types. All urban spaces are harmoniously integrated with their adjacent physical context in which movement pattern is enhanced by the pedestrianized route of the city's Golden Z. Findings show that urban streets provide ideal enclosure while fulfilling human scale qualities. Yet, except the case of St Andrews Square scores indicate that urban squares in the city centre are effective in catering to diverse social groups and activities.

Five of the social attributes scored relatively high indicating their role in enhancing the overall quality of both urban squares and streets. These are: harmony with the surrounding context, accessibility from the adjacent physical context, reachability by various options of transportation, and accommodating diverse activities of various social groups. However, two attributes appear to negatively impact the spaces: functionality and accessibility for users with special needs. On the other hand, a comparison between George Square and Argyle Street uncovers key differences. Although the former can be seen as a platform that serves different age groups from various ethnic backgrounds by offering sense of inclusivity and diversity of activities, it scored lower than the latter, which demonstrates better

quality in terms of interaction, efficiency of use, accessibility, especially for user with special needs, human scale, and contextual harmony (Figure 6).

Perceptual Attributes

The assessment of perceptual attributes reveals that urban spaces combined appear to be just appropriate receiving a total average score of 2.96 (Table 4). The degree of appropriateness can be seen within the spaces in three levels. Spaces that scored as highly appropriate are Buchanan Galleries (3.42), Central Bus Square (3.20) and George Square (3.13). Spaces that scored just appropriate are St. Enoch Square (3.02), Sauchiehall Street (3.02), GOMA (2.94) and Argyle Street (2.85). While still in the category of appropriate, two spaces scored the lowest: St. Andrews Square (2.69) and Clyde Street (2.40), corroborating a similar level of appropriateness achieved in functional and social attributes.

The findings suggest that the city centre of Glasgow is a dynamic urban case that is highly appropriate for social activities. They foster the sense of place by offering a spectrum of opportunities for a pleasing experience. Supporting a sense of relaxation and comfort the feeling of privacy and personal distance appear to be respected.

Table 3. Outcomes of assessing the social attributes of the selected urban open spaces

Social Attributes	Sense of interaction	Inclusivity	Diversity of Age Groups	Diversity of Activities	Ethnic Diversity	Efficiency of use	Functionality	Reachability	Accessibility	Accessibility for Special Users	Human Scale	Harmony	Total Average / Space
George Square	2.50	3.00	3.00	3.25	3.25	2.50	2.50	4.00	2.50	2.75	3.00	3.25	**3.04**
Exchange Square/GOMA	3.00	3.00	3.00	3.25	3.25	3.50	2.25	3.00	3.25	3.00	3.25	3.25	**3.08**
St. Enoch Square	3.75	3.25	3.25	3.25	3.50	3.25	3.25	3.75	3.75	3.50	3.50	4.00	**3.50**
Argyle Street	2.75	2.75	3.25	3.00	3.00	3.00	2.50	4.00	4.00	4.00	3.50	3.75	**3.29**
Sauchiehall Street	4.00	4.00	4.00	3.50	4.00	3.75	3.25	3.25	4.00	3.75	3.50	3.75	**3.73**
Buchanan Galleries	3.25	3.25	2.75	3.25	3.25	3.25	2.50	3.75	3.75	2.25	3.50	3.50	**3.19**
Clyde Street	3.00	2.50	1.75	2.00	2.25	1.50	1.75	2.50	2.25	1.25	2.50	2.50	**2.15**
St Andrews Square	2.00	2.25	1.75	1.25	2.25	1.50	1.50	2.00	2.75	2.25	3.00	3.00	**2.13**
Central Bus Station Square	3.50	3.50	3.75	3.75	3.50	3.50	3.50	4.00	3.75	3.00	3.00	3.25	**3.50**
Overall Assessment	**3.08**	**3.05**	**2.94**	**2.94**	**3.14**	**2.86**	**2.55**	**3.36**	**3.33**	**2.86**	**3.31**	**3.36**	**3.07**

≤ 1.00 (Highly Inappropriate)	> 1.00 – 2.00 (Inappropriate)	> 2.00 – 3.00 (Appropriate)	> 3.00 Highly Appropriate

George Square

Argyle Street

Figure 6. City life and diversity of social activities in two spaces with different spatial qualities

Additionally, the results reveal that urban squares provide a memorable and attractive architectural character that enables an effective spatial experience. Yet, urban streets score higher than urban squares in the sense that they are able to sustain the feeling of vibrancy while accommodating an array of uses and thus diverse activities.

In essence, the perceptual attributes can be divided into two levels. The first is essential in generating the city life, which includes suitability and desirability, relaxation and comfort, human needs, safety and security, cultural diversity, acceptability, night engagement and density of users. The second level involves memory, attractiveness, identity and history, and distinction and recognition, which can be regarded as secondary perceptual factors that have an indirect impact on the social activities within Glasgow City Centre. Still, this level of factors generates good quality for urban squares while enriching them as public places with vibrant social activities.

DISCUSSION OF KEY FINDINGS OF THE PHOTOGRAPHIC ATTITUDE SURVEY

Based on responses received from 35 users the analysis of the photographic attitude survey portrays the way in which they perceive and comprehend the nine selected urban open spaces as they relate to their experience of Glasgow City Centre.

Experience-based Users Perception

George Square is considered to be Glasgow's 'Grande' Place where 71% of the respondents consider it as most representative of the city while 43% view it as the most liked space. Despite that only 25% regularly visit and pass-by the square, this appears to be still higher than other spaces (Figure 7). This can be attributed to the square as a community space that fulfils a multitude of functions within the heart of the city, accommodating different events and functions including civic functions, seasonal commercial fairs, large events such as the city Hogmanay celebrations, the Winter Wonderland, and occasionally host pipe bands.

Table 4. Outcomes of assessing the perceptual attributes of the selected urban open spaces

Perceptual Attributes	Suitability and Desirability	Relaxation and Comfort	Human Needs	Safety & Security	Memory	Cultural Diversity	Attractiveness	Acceptability	Identity & History	Distinction / Recognition	Night Engagement	Density of Users	Total Average / Space
George Square	3.25	3.00	2.75	3.00	3.75	2.50	3.50	2.75	3.50	3.50	3.00	3.00	**3.13**
Exchange Square/GOMA	3.00	3.25	3.25	2.50	3.50	2.00	2.75	3.75	3.25	3.25	2.00	2.75	**2.94**
St. Enoch Square	3.25	3.50	3.00	3.00	3.25	2.75	3.00	3.00	3.25	3.25	2.50	3.00	**3.02**
Argyle Street	3.25	3.25	3.50	3.00	2.25	2.25	3.00	2.75	2.00	3.25	2.00	3.75	**2.85**
Sauchiehall Street	3.25	3.50	4.00	3.50	2.00	3.00	3.00	3.00	2.00	3.50	2.00	3.50	**3.02**
Buchanan Galleries	3.50	3.75	3.25	3.50	3.75	3.00	3.25	2.75	3.75	3.75	3.25	3.50	**3.42**
Clyde Street	2.75	3.00	2.75	2.00	1.75	2.25	2.75	2.75	2.50	2.75	1.50	2.00	**2.40**
St Andrews Square	2.00	2.50	2.50	2.50	3.00	1.50	3.50	3.75	3.25	3.25	2.50	2.00	**2.69**
Central Bus Station Square	3.00	3.00	3.25	3.25	3.75	3.00	3.25	2.00	3.50	3.50	3.00	3.75	**3.20**
Overall Assessment	**3.03**	**3.19**	**3.14**	**3.92**	**3.00**	**2.47**	**3.11**	**2.94**	**3.00**	**3.33**	**2.42**	**3.03**	**2.96**

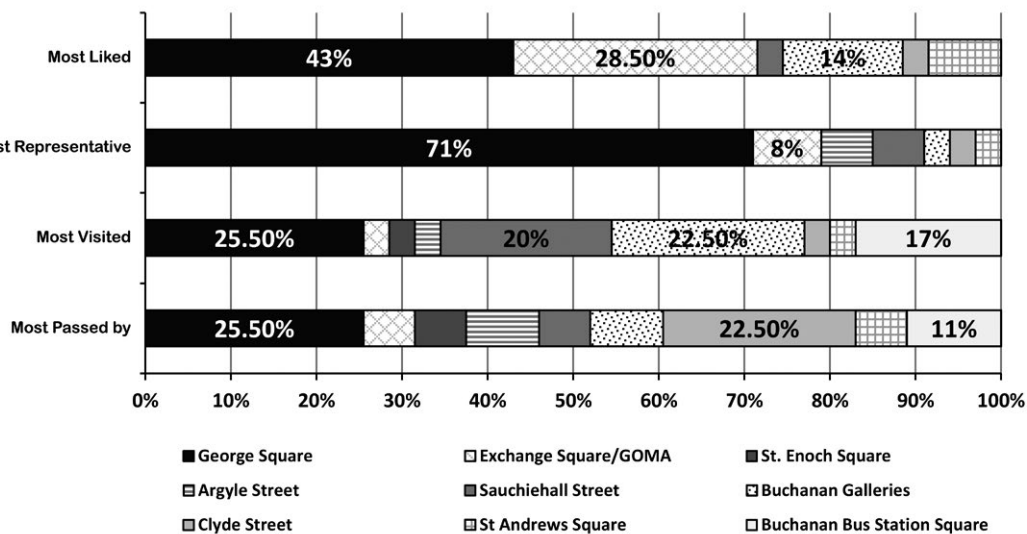| ≤ 1.00 (Highly Inappropriate)	> 1.00 – 2.00 (Inappropriate)	> 2.00 – 3.00 (Appropriate)	> 3.00 Highly Appropriate

Figure 7. Users description of the spaces as they relate to the city and to their experience

Approximately 28.5% of the respondents rate the GOMA Square as the second most liked urban space. This can be attributed to its accessibility and proximity to the most active streets and squares in the centre. It also acts as a vibrant pathway between Buchanan Street in the West and George Square and the Merchant City in the East. The presence of benches, steps, and street furniture create various settings and meeting points.

The analysis also demonstrates that Buchanan Galleries is perceived as the second most visited urban space by 22.5% of the total respondents. This can be attributed to its unique position at the intersection of two important pedestrian commercial streets: Buchanan Street and Sauchiehall Street, along the city's Golden Z, which offers a great opportunity to accommodate a diversity of small shops, cafes, banks and main shopping malls. The availability of steps leading to the galleries enriches the space and provides opportunities for various social gatherings, public talks, and music performances (Figure 8). Clyde Street, on the other hand, is perceived by 22.5% of the respondents as the second passed-by space. This can be attributed to its location along the Clyde River, which links the bustles of the city centre of Glasgow with the waterfront. In essence, it is mostly used by those who enjoy walking, cycling and relaxing, but palpably does not accommodate any diversity of land use. However, differences in the perception of Buchanan Galleries and Clyde Street clearly indicates that while the geographical location of the space may enable vibrancy, the availability of a spectrum of uses help instigate active engagement.

Users Description of Urban Space Contrasting Qualities

Participants in the survey responded to the images of each space using polar adjectives that best describe it. In this respect, reflections are centred on key paired objectives that demonstrate differences: inviting/uninviting, iconic/ordinary, distinctive/indistinctive, vibrant/boring, urban/peripheral, familiar/unfamiliar, pleasing/unpleasing, and restful/stressful (Figure 9). For the majority of respondents, the inviting urban spaces are George Square, GOMA Square and Buchanan Galleries, while Clyde Street and Argyle Street are described as uninviting urban spaces. In the case of Clyde Street, this clearly corresponds with the results of the assessment since it scored low when compared to all other spaces.

GOMA, Buchanan Galleries, George Square and St. Enoch Square have been described as iconic urban spaces. This can be attributed to their qualities in terms of accommodating historical structures or important buildings, or dominant features. However, the majority of respondents perceive Argyle Street, Clyde Street and Central Bus Station Square as ordinary spaces, an outcome that reflects their spatial qualities. The majority of case studies are perceived as neutral in terms of distinctiveness. Yet, only four spaces are recognised as distinctive by the respondents namely; GOMA, Buchanan Galleries, St. Andrews Square and George Square; this corresponds to the perception of them being inviting and iconic. It can be conjectured that proximity, centrality and diversity of land use play a major role in users perception.

The preceding interpretation can be clearer when comparing the most vibrant urban spaces such as Buchanan Galleries, GOMA, and George Square, with Clyde Street and St. Andrews Square as inactive urban spaces. Furthermore, GOMA, Buchanan Galleries and George Square are perceived as inviting, iconic, distinctive and vibrant urban spaces in the city centre of Glasgow. On the other hand, Argyle Street and Clyde Street are clearly less inviting and iconic; they have received the least frequencies of description by the users as vibrant (Figure 9). In addition, the respondents perceive all nine spaces as urban, familiar, and pleasing. Another interesting finding is that GOMA, St. Andrews Square and Buchanan Galleries are described as restful urban spaces, while Argyle Street, St. Enoch Square and Sauchiehall Street and Central Bus Station Square are described as stressful. This can be attributed to the degree of intensity of use and the level of pedestrian crowding that characterise these spaces.

CONCLUSIONS

Contributing to the current discussions on urban open spaces as integral component of the urban structure of cities, this paper presented the outcomes of a mechanism for characterisation and systematic assessment of key urban open spaces in Glasgow City Centre. Three layers of investigation were conceived including the development of space profiles through preliminary observations, an investigation of functional, social and perceptual attributes through a walking tour assessment procedure, and an understanding of how users perceive and comprehend these spaces through a photographic attitude survey.

Clyde Street   Buchanan Galleries

Figure 8. Engagement and social activities are determined by location and the availability of an array of uses
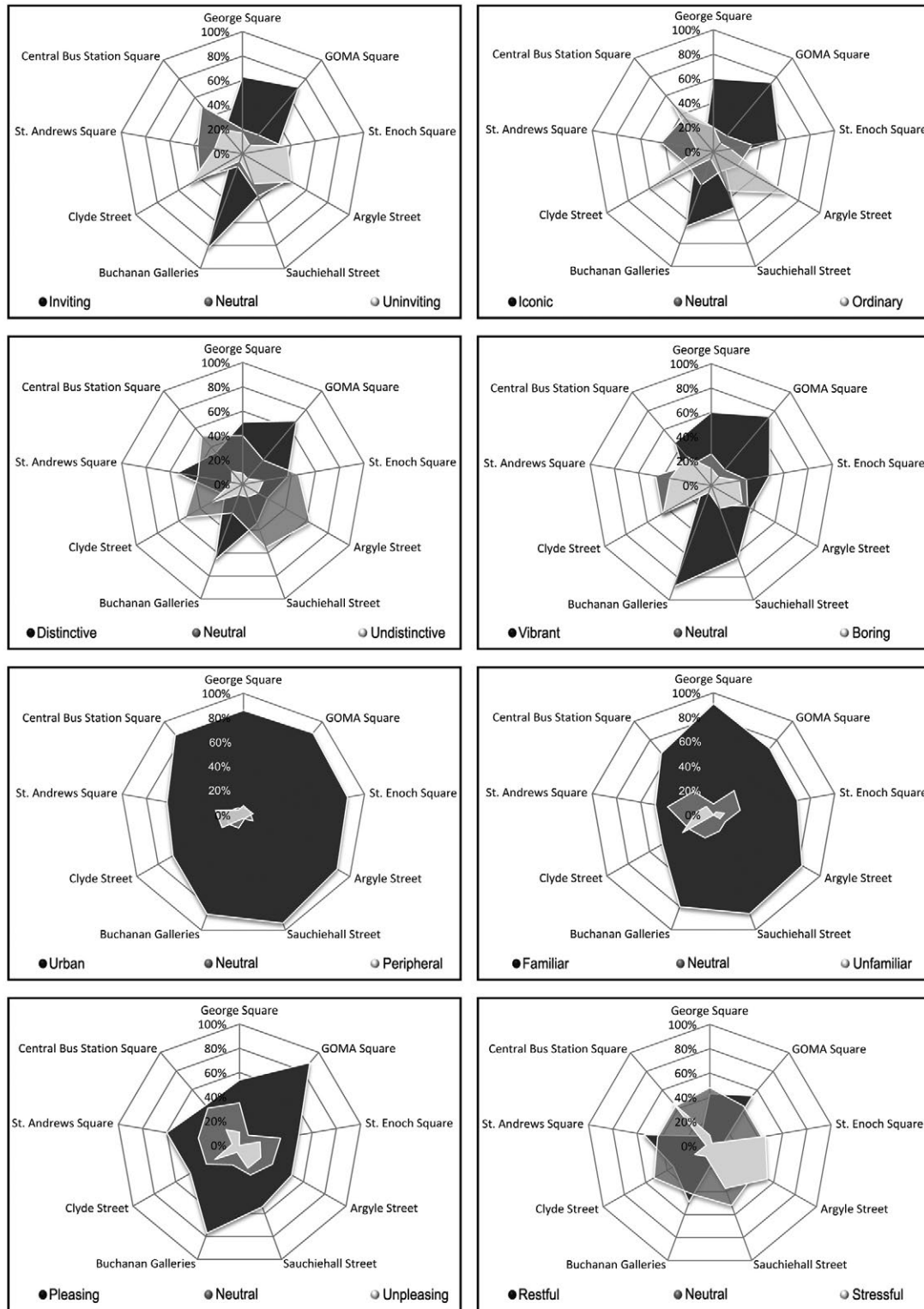
Figure 9: Key adjectives that demonstrate differences and contrasting qualities in users description of the nine urban spaces in Glasgow City Centre

While the discussion has focused its scope to the key findings of these layers, reported results on similarities and differences between the nine spaces identified were established while the way in which those spaces are perceived and described was deducted. The outcomes of the photographic attitude survey correspond with the findings of the assessment. Understanding users perception and description of the urban spaces they continuously experience enable the development of insights into spaces that are most liked, most visited, most passed-by, and those that users see as representing the city.

The walking tour assessment procedure enabled the interpretation of various attributes of urban spaces by concentrating on specific factors. The examination uncovers slight differences in the total average assessment scores of the nine spaces. The overall quality of the social attributes is highly appropriate scoring 3.07, followed by the functional

Table 5. The overall walking tour assessment scores per space and per set of attributes

	Functional Attributes	Social Attributes	Perceptual Attributes	Average Score/Space
George Square	3.42	3.04	3.13	**3.20**
Exchange Square/GOMA	2.88	3.08	2.94	**2.97**
St. Enoch Square	3.60	3.50	3.02	**3.37**
Argyle Street	2.81	3.29	2.85	**2.98**
Sauchiehall Street	3.20	3.73	3.02	**3.32**
Buchanan Galleries	3.20	3.19	3.42	**3.27**
Clyde Street	2.30	2.15	2.40	**2.28**
St Andrews Square	2.70	2.13	2.69	**2.51**
Central Bus Station Square	3.30	3.50	3.20	**3.33**
Average Score/Set of Attributes	**3.04**	**3.07**	**2.96**	

attributes with a score of 3.03, while perceptual attributes appear to be just appropriate scoring 2.96 (Table 5). The findings suggest that seven of the selected urban spaces in the city centre of Glasgow appear to be highly appropriate reflecting relatively high scores in the three categories of attributes. They also insinuate that St. Andrews Square and Clyde Street appear to be less appropriate, especially in their social attributes.

The findings convey that functional attributes play a significant role in generating city life. Yet, four factors appear to impact the quality of some spaces negatively; these are: the variety of uses, ecological quality, the richness of visual experience and the variety of landscape elements. In contrast, reachability, ethnic diversity, and human scale are attributes that enhance the level of appropriateness of urban spaces. It is evident that the sense of interaction and inclusivity invigorate urban space qualities. Other attributes such as diversity of age groups and activities, functionality, efficiency of use and accessibility for special users would negatively impact the level of appropriateness. Likewise, night engagement, cultural diversity and acceptability are important perceptual attributes and when identified as less appropriate they influence the overall quality of urban spaces.

Conducting characterisation and systematic assessment coupled with an exploration of users perception of the urban spaces can be seen as a utility that facilitates the identification and the subsequent understanding of the spatial experience as it relates different types of attributes. While these procedures resulted in effective outcomes with respect to strengths or weaknesses in key qualities, one limitation is that the assessment does not engage with knowledge about movement patterns or the actual usability of the spaces. An exploratory investigation, however, is being undertaken to implement direct observation and behavioural mapping as systematic methods for describing and analysing the dynamics of users interaction with the spatial environment within the nine spaces identified in Glasgow City Centre. The results of implementing such methods would establish complementary and enhanced rationalisations of the three layers adopted in this paper.

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