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An Evaluation on Citizens' Satisfaction with the Outdoor Landscape Lighting in Gyeongju Historic Areas
- The Case of Wolseong District -

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ABSTRACT

The purpose of this study was to survey the citizens for their satisfaction with the outdoor landscape lighting in Gyeongju Historic Areas registered as UNESCO World Cultural Heritage in November 2000 and thereupon, provide for some basic data useful to the design of the outdoor landscape lighting for the cultural properties.

As a result of examining the conditions of the outdoor landscape lighting in Wolseong Zone of Anapji, Banwolseong, Dongbu Sajeokji, Cheomseongdae and Gyerim, there were found 391 lighting fixtures of 12 types in Anapji, 138 lightings of 4 types in Banwolseong, 38 lightings of 6 types in Cheomseongdae, 28 lightings of 3 types in Dongbu Sajeokji and 54 lightings of 5 types in Gyerim.

As a result of analyzing citizens' satisfaction with the outdoor landscape lighting, it was found that citizens were satisfied more or less with the nightscape image changed by the outdoor landscape lighting; their satisfaction scored 3.836 on average for Anapji on a 5-point Likert type scale, 3.516 for Banwolseong, 3.446 for Dongbu Sajeokji, 3.650 for Cheomseongdae and 3.479 for Gyerim. However, citizens' satisfaction with the originality of the nightscape was generally low: 3.055 for Anapji, 2.914 for Cheomseongdae, 2.877 for Banwolseong, 2.847 for Gyerim and 2.665 for Dongbu Sajeokji. On the other hand, since most of the lighting fixtures were installed as inserted lights or floodlights, the color tones of light source were relatively highly distinctive, but the peripheral spaces around the cultural properties were rather dark, which means that citizens were feeling inconvenient more or less for using the amenities such as bench or waste box. All in all, their satisfaction with the outdoor landscape at the sample zone at night scored 2.981, lower than the normal level.

Key Words: World Cultural Heritage, Cultural Property, Lightings, Nightscape

Ⅰ. Introduction

Lately, people's life styles and needs have been changing owing to '5-day workweek' and other changed living conditions favorable to workers. On the other hand, people desire more to have not only their economic needs but also their mental and cultural needs fulfilled. Hence, activities at night have been as much important as those during the day-time.

Recently, the outdoor landscape lighting facilities were installed in the historic areas of Gyeongju, the capital of the millenium kingdom Shilla, and thus, the citizens viewing the historic cultural assets at night are increasing, which suggests that the nightscape is an important factor affecting the aesthetic and environmental quality of the historic areas.

All in all, the outdoor landscape lighting is very important for the nightscape of the historic areas located within an urban environment. The outdoor landscape lighting decorates and beautifies the city as well as makes the city safer and

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more elegant. People's impression with the time-honored historic cultural properties at night may well be affected much by the outdoor landscape lighting regardless of their viewing distance, from near or afar. In addition, the outdoor landscape lighting may well serve to highlight the traditional views of ethics, morality, humanity or purism (Ji *et al.*, 2000).

As it is, the outdoor landscape lighting for the cultural properties is intended to highlight their characteristics and originality and thereby, play a role of the landmark signifying the identity of a historic city. In addition, the outdoor landscape lighting for the cultural properties may well be a good tourism resource symbolizing the historicity and culturality of the city as it has some artistic and cultural values to express texture, decoration and color tone of the cultural properties aesthetically (Shin, 2006). Hence, the outdoor landscape lighting needs to be designed to highlight the cultural properties, not distorting them at night (Lee, 2010).

With such basic conceptions in mind, this study was aimed at surveying the citizens for their satisfaction with the outdoor landscape lighting in the historic areas and thereby, providing for some basic data useful to the design of the outdoor landscape lighting for the cultural properties.

Ⅱ. Theoretical Research

Lee (1999) assessed the optical effects of the outdoor landscape lighting by its component. Specifically, the researcher surveyed and analyzed the locality of the cultural properties within the city and their unique symbolicity and reputation and thereby, suggested the ways to improve the reputation of Bosingak Pavilion in the downtown of Seoul. Ahn (2000) surveyed and analyzed the conditions of the outdoor landscape lighting for Namdaemun and Dongdaemun representing Korea's historic buildings. The researcher used field survey, physical quantity analysis and psychological quantity analysis of luminance. Kim and Kim (2004) surveyed the outdoor landscape lighting for Suwon Hwaseong focusing on luminance, color temperature and chromaticity, etc., and thereupon, suggested the solutions to the problems identified. Lee (2004) examined the foreign cases of the outdoor landscape lighting and researched into components, sources and fixtures of the outdoor landscape lighting, and thereupon, suggested a model design of the outdoor landscape lighting for Jeonnamg wan. Lee *et al.*, (2005) analyzed citizens' perception of the street landscape lighting for a historical area and assessed their satisfaction with the lighting and thereupon, identified the variables and factors affecting citizens' perception of the street landscape lighting and thereby, suggested some reform measures to improve the outdoor landscape lighting. Shin (2006) analyzed people's psychological preferences of or cognitive responses to the outdoor landscape lighting for the cultural properties and therewith, identified the factors affecting people's psychological preferences as well as the vocabulary thereof, and then, determined the correlations between preferences and cognitive variables to suggest the factors affecting people's perception of the outdoor landscape lighting. Lee (2006) reviewed the outdoor landscape lighting for the cultural properties from the perspective of the city planning. The researcher examined the plans of the existing linear outdoor landscape lighting for the cultural properties and then, sampled Sejongro-Namdaemun Street to analyze the outdoor landscape lighting conditions of the street and thereby, suggested the solutions to the problems identified. The preceding studies assessed the outdoor landscape lighting for the historic areas or some major urban streets and thereby, suggested some solutions to improve the lighting, but few preceding studies focused on the effects of each component of the outdoor landscape lighting on citizens' psychological satisfaction.

Thus, this study aimed to examine the historical characteristics of Gyeongju Historic Area and citizens' uses of it, and then, surveyed the conditions of the outdoor landscape lighting through a field survey, and thereupon, analyzed the conditions of the lighting and citizens' satisfaction with it.

Ⅲ. Method

1. Research Method and Scope

1) Over View the Sample Zone

Gyeongju Historic Areas were registered as UNESCO World Cultural Heritage in November 2000. The historic remains from Shilla Kingdom are dispersed throughout the city Gyeongju. The historic areas are divided into five zones according to their historic nature: Namsan Zone as the center of Shilla Buddhism art, Wolseong Zone as the site of the millenium kingdom palace, Daerungwon Zone as the royal family (king, queen and aristocrats) tomb site, Hwangryongsa Temple Zone as the center of Shilla Buddhism, and Sanseong Zone as the

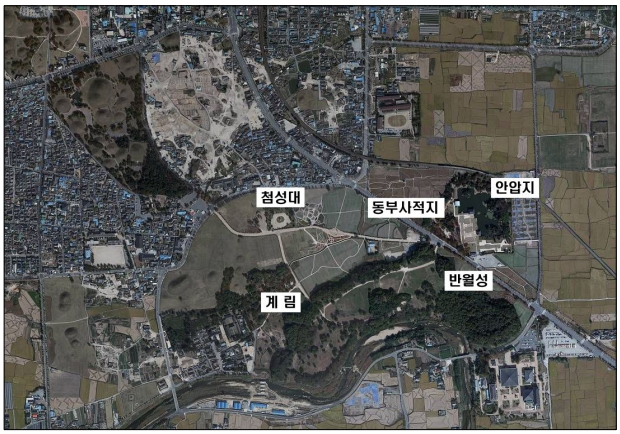

Figure 1. Locations of the sample cultural properties
Data: http://www.google.com/earth/index.html

site of a core defense fortress of the kingdom.

Since it aimed to examine citizens' satisfaction with the historic areas illuminated by the outdoor landscape lighting, this study sampled Wolseong Zone equipped with the outdoor landscape lighting. This zone or the site of the millenium kingdom place consists of 5 sub-zones: Anapji (Historic Site #18), Banwolseong, Dongbu Sajeokji, Cheomseongdae (National Treasure #31) and Gyerim (Historic Site #19). (Refer to Figure 1)

2) Method of Survey

(1) Field Survey

In order to check the locations and number of the outdoor landscape lighting fixtures in the sample zone, the researchers visited the Department of Cultural Assets of Gyeongju City Hall on April 9, 2010 and collected some basic data, and thereupon, conducted a field survey and a questionnaire survey in parallel from April 11 through June 6, 2010.

(2) Design of the Questionnaire

The questionnaire for this study consisted of a total of 76 items which could be divided into 4 categories: citizens' demographic variables (6 items), frequency of visits to the sample zone at night (10 items), citizens' satisfaction with the outdoor landscape lighting (10 items for each sub-zone or 50 items in total) and citizens' satisfaction with the sample zone at night (10 items). Subjects were requested to answer each question item on a 5-point Likert scale: 5 points for 'I think so very much,' 4 points for 'I think so,' 3 points for 'I don't know,' 2 points for 'I don't think so' and 1 point for 'I can never agree.'

(3) Questionnaire Survey

A preliminary questionnaire survey was conducted for the period from April 26 through 30, 2010 to design the main survey, and thereupon, the questionnaire was modified and complemented for the main survey which would be conducted for 4 weeks from May 8 to June 6, 2010. The citizens who were visiting the sample zone at night (from 6 pm to 11 pm) were sampled randomly to respond to the questionnaire. 284 citizens out of 300 ones returned the questionnaire answered to the researchers. A total of 271 responses excluding 13 ones deemed incomplete were used for the final analysis.

3) Method of Analysis

The data collected were encoded using the MS Excel 2007 (Microsoft Corporation, 2007) version and then, were processed statistically using the WIN SPSS 15.0 (SPSS Inc, 2008) program for the frequency analysis in order to identify respondents' uses of the sample zone as well as their demographic variables.

Ⅳ. Results and Discussions

1. Conditions of the Outdoor Landscape Lighting

1) General Conditions of the Outdoor Landscape Lighting in the Sample Zone

Anapji was illuminated at night by 12 types of lighting in total, and the lighting focused on building site, promenade, parking lot, Dancheong (pavilion), pine trees, embankment and trees thereupon, right-side trees, bamboos, forestry, detention reservoir, natural background, etc. 18 floodlights of 1KW were installed for building site, promenade and parking lot, and 42 inserted lights of 150W were deployed for Dancheong (pavilion). Pine trees were illuminated by 23 floodlights of 35W, 30 lights of 70W, and 23 floodlights of 150 W, and embankment and trees thereupon were illuminated by 85 floodlights of 150W. The right-side wood was illuminated by 17 floodlights of 75W, the bamboos were spotlighted by 27 floodlights of 150W, and the forestry was illuminated by 39 floodlights of 70W. The main promenade

Figure 2. A view of Anapji at night
Data: Photo by Authors

was covered by 77 floodlights of 40W, the detention reservoir was highlighted by 2 floodlights of 100W, and the natural background was illuminated by 8 floodlights of 100W. In total, 391 lighting fixtures were installed for Anapji (Refer to Figure 2).

3 types of lighting were installed for Dongbu Sajeokji: 21 all-around floodlights of 250W, 4 floodlights of 250W and 3 floodlights of 400W.

4 types of lighting were deployed for Banwolseong: 87 floodlights of 250W, 22 floodlights of 100W, 9 floodlights of 400W and 20 LEDs, totalling 138 lights (Refer to Figure 3).

Cheomseongdae was illuminated by 4 kinds of tree lighting and 2 kinds of observatory lighting. The trees were illuminated by a floodlight of 150W, a floodlight of 35W and 4 floodlights of 150W and 18 floodlights of 250W, while the observatory was highlighted by 4 floodlights of 150W and 9 floodlights of 400W. A total of 38 lights were illuminating Cheomseongdae and its surrounding (Refer to Figure 4).

Figure 3. A view of Dongbu Sajeokji and Banwolseong at night
Data: Photo by Authors

Figure 4. A view of Cheomseongdae at night
Data: Photo by Authors

Figure 5. A view of Gyerim at night
Data: Photo by Authors

Gyerim was illuminated by 2 types of lighting installed inside and another 2 types of lighting installed outside. The inside was illuminated by 10 floodlights (all-around lighting) of 250W and 9 floodlights of 70W, while the outside was covered by 6 floodlights of 4,000W and 13 floodlights of 250W. A total of 38 lighting fixtures were installed for Gyerim (Refer to Figure 5).

2. Users' Demographic Variables and Behaviors

1) Users' Demographic Variables

As shown in the Table 1, males (n=140, 51.7%) were a little more than females (n=131, 48.3%). Those in their 20's accounted for 39.1% (n=106), while students accounted for 33.9% (n=92). Those who graduated from or were attending college accounted for the majority (63.8%, n=173). Such finding suggests that the historic areas tend to appeal to the young generation at night (Refer to Table 1).

Table 1. Results of demographic analysis

Division		Frequency (n)	Ratio (%)	Cumulative ratio (%)
Gender	Males	140	51.7	51.7
	Females	131	48.3	100.0
	Sub-total	271	100.0	-
Age	Younger than 20	4	1.5	1.5
	21~30	106	39.1	40.6
	31~40	63	23.2	63.8
	41~50	69	25.5	89.3
	51~60	28	10.3	99.6
	Older than 60	1	0.4	100.0
	Sub-total	271	100.0	-
Job	Service	15	5.5	5.5
	Public official	38	14.0	19.6
	Company employee	42	15.5	35.1
	Self-employed	26	9.6	44.6
	Professional	19	7.0	51.7
	Housewife	29	10.7	62.4
	Student	92	33.9	96.3
	Others	10	3.7	100.0
	Sub-total	271	100.0	-
Academic background	Middle school or lower	5	1.8	1.08
	High school	80	29.5	31.4
	College	173	63.8	95.2
	Graduate school	13	4.8	100.0
	Sub-total	271	100.0	-

Table 2. Users' behaviors

Division		n	Ratio (%)	Cumulative ratio (%)
Frequency	First time	11	4.1	4.1
	2~3 times	65	24.0	28.0
	Once per season	116	42.8	70.8
	Once per week	18	6.6	77.5
	Once per month	52	19.2	96.7
	3 times or more per month	9	3.3	100.0
	Sub-total	271	100.0	-
Time for access	Within 30 min.	134	49.4	49.4
	30 min.~1 hr.	88	32.5	81.9
	1~2 hr.	32	11.8	93.7
	2~3 hr.	6	2.2	95.9
	Longer than 3 hr.	10	3.7	99.6
	Others	1	4	100.0
	Sub-total	271	100.0	-
Time of stay	Within 15 min.	13	4.8	4.8
	15~30 min.	66	24.4	29.2
	30 min.~1 hr.	134	49.4	78.6
	1~2 hr.	53	19.6	98.2
	Longer than 2 hr.	5	1.8	100.0
	Sub-total	271	100.0	-

2) Users' Behaviors

As shown in the Table 2, those who had visited the sample zone once a season accounted for 42.8% (n=116) (Refer to Table 2).

On the other hand, as shown in the Table 3, 42.8% (n=116) visited the sample zone from 7 to 8 pm, and 26.2% (n=71) came to the zone from 8 to 9 pm. About half of the visitors (49.4%, n=134) stayed for 30~60 minutes, and 39.1% (n=106) used the sample zone on Sunday or during holidays, while 28% (n=76) used the zone on Saturday. 39.1 % (n=106) answered that they had visited the sample zone regardless of seasons (Refer to Table 3).

As shown in the Table 4, 35.8% (n=97) visited the sample zone for a walk, 23.6% (n=64) came to the zone to enjoy the nightscape and 16.6% (n=45) visited the zone for family picnic. On the other hand, 48.7% (n=132) used the sample zone with their family members, while 42.8% (n=116) came to the zone with friend or lover (Refer to Table 4).

3. Users' Satisfaction

1) Satisfaction with the Outdoor Landscape Lighting

(1) Variables of Satisfaction by Sub-zone

The highest score of citizens' satisfaction with the sub-zones (Y1) on average was 3.739 for Anapji, followed by 3.535 for Cheomseongdae, 3.345 for Banwolseong, 3.334 for Gyerim and 3.286 for Dongbu Sajeokji in their order. The overall satisfaction was higher than the normal level.

(2) Variables of Satisfaction with the Outdoor Landscape Lighting

The highest score of citizens' satisfaction with the outdoor landscape lighting (X1) on average was 3.457 for Anapji, followed by 3.159 for Banwolseong, 3.085 for Dongbu Sajeokji, 3.304 for Cheomseongdae and 3.074 for Gyerim in their order. Namely, the outdoor landscape lightings of Anapji, Banwolseong and Cheomseongdae satisfied the citizens more than normal, while those of Dongbu Sajeokji and Gyerim satisfied citizens more or less.

Table 3. Visiting time

Division		N	Ratio (%)	Cumulative ratio (%)
Day of the week	Sunday (holiday)	106	39.1	39.1
	Saturday	76	28.0	67.2
	Week day	19	7.0	74.2
	Regardless of the day of the week	65	24.0	98.2
	Others	5	1.8	100.0
	Sub-total	271	100.0	-
Season	Spring	83	30.6	30.6
	Summer	48	17.7	48.3
	Autumn	33	12.2	60.5
	Winter	1	0.4	60.9
	Regardless of season	106	39.1	100.0
	Sub-total	271	100.0	-
Time frame	18~19 o'clock	51	18.8	18.8
	19~20 o'clock	116	42.8	61.6
	20~21 o'clock	71	26.2	87.8
	21~22 o'clock	22	8.1	95.9
	22~23 o'clock	3	1.1	97.0
	24 o'clock or later	8	3.0	100.0
	Sub-total	271	100.0	-

Table 4. Purpose and pattern

Division		N	Ratio (%)	Cumulative ratio (%)
Purpose	Exploration of cultural assets	18	6.6	6.6
	Nightscape	64	23.6	30.3
	Walk	97	35.8	66.1
	Meeting	20	7.4	73.4
	Family picnic	45	16.6	90.0
	Others	27	10.0	100.0
	Sub-total	271	100.0	-
Pattern	Alone	15	5.5	5.5
	With friend or lover	116	42.8	48.3
	With family members or relatives	132	48.7	97.0
	With colleagues	6	2.2	99.3
	In a society group	2	0.7	100.0
	Sub-total	271	100.0	-

The highest score of citizens' satisfaction with the location of the lighting (X2) on average was 3.438 for Anapji, followed by 3.334 for Cheomseongdae, 3.104 for Banwolseong, 3.085 for Dongbu Sajeokji and 3.029 for Gyerim in their order. Namely, citizens were satisfied more than the normal level with the locations of lighting in case of Anapji, Banwolseong and Cheomseongdae, while being satisfied more or less with those of Dongbu Sajeokji and Gyerim.

On the other hand, the highest score of satisfaction with the lighting quantity (X3) on average was 3.375 for Anapji, followed by 3.256 for Cheomseongdae, 3.029 for Banwolseong, 2.951 for Dongbu Sajeokji and 2.940 for Gyerim in their order. Namely, the lighting quantity was at the normal level in case of Anapji, Cheomseongdae and Banwolseong, but rather poor in case of Dongbu Sajeokji and Gyerim.

The highest score of satisfaction with the design of the outdoor landscape lighting (X4) on average was 3.137 for Anapji, followed by 3.044 for Cheomseongdae, 3.033 for Gyerim, 2.914 for Banwolseong and 2.784 for Dongbu Sajeokji in their order. Namely, satisfaction with the lighting design of Anapji was at th normal level, but citizens were dissatisfied with the lighting designs of the other 4 sub-zones.

The highest score of satisfaction with the nightscape (X5) on average was 3.754 for Anapji, followed by 3.501 for Cheomseongdae, 3.397 for Banwolseong, 3.301 for Gyerim and 3.211 for Dongbu Sajeokji in their order. Namely, citizens were satisfied more than normal with the nightscape of all the sub-zones, and charmed by the nightscape of Anapji, particularly.

The highest score of satisfaction with the originality of the nightscape (X6) on average was 3.055 for Anapji, 2.914 for Cheomseongdae, 2.877 for Banwolseong, 2.847 for Gyerim and 2.665 for Dongbu Sajeokji in their order. Namely, citizens perceived that the nightscape of Anapji was more or less original, but that those of the other 4 sub-zones were not original.

The highest score of satisfaction with the changed image of nightscape (X7) on average was 3.836 for Anapji, followed by 3.516 for Banwolseong, 3.446 for Dongbu Sajeokji, 3.650 for Cheomseongdae and 3.459 for Gyerim in their order. Namely, citizens perceived that the nightscapes of all sub-zones, particularly that of Anapji, had improved much.

The highest score of satisfaction with the harmony between lighting and surrounding environment (X8) on average was 3.650 for Anapji, 3.375 for Cheomseongdae, 3.260 for Banwolseong, 3.178 for Dongbu Sajeokji and 3.174 for Gyerim in their order. Namely, citizens were satisfied more than normal with the harmony between lighting and surrounding environment.

The highest score of satisfaction with the chromacity of the lighting (X9) on average was 3.356 for Cheomseongdae,

Table 5. Satisfaction with the outdoor landscape lighting by sub-zone

Item	Anapji	Banwolseong	Dongbu Sajeokji	Cheomseongdae	Gyerim
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
X1	3.457 (0.759)	3.159 (0.763)	3.085 (0.730)	3.304 (0.784)	3.074 (0.802)
X2	3.438 (0.838)	3.104 (0.794)	3.085 (0.830)	3.334 (0.791)	3.029 (0.845)
X3	3.375 (1.965)	3.029 (0.795)	2.951 (0.797)	3.256 (0.822)	2.940 (0.835)
X4	3.137 (0.872)	2.914 (0.835)	2.784 (0.809)	3.044 (0.854)	3.033 (2.525)
X5	3.754 (0.717)	3.397 (0.829)	3.211 (0.861)	3.501 (0.731)	3.301 (0.783)
X6	3.055 (0.898)	2.877 (0.916)	2.665 (0.832)	2.914 (0.891)	2.847 (0.882)
X7	3.836 (0.709)	3.516 (0.775)	3.446 (0.718)	3.650 (0.725)	3.479 (0.775)
X8	3.650 (0.751)	3.260 (0.845)	3.178 (0.879)	3.375 (0.835)	3.174 (0.861)
X9	3.286 (0.908)	2.985 (0.841)	3.044 (0.766)	3.356 (0.809)	3.029 (0.854)
Y1	3.739 (0.805)	3.345 (0.891)	3.286 (0.826)	3.535 (0.870)	3.334 (0.841)

followed by 3.286 for Anapji, 3.044 for Dongbu Sajeokji, 3.029 for Gyerim and 2.985 for Banwolseong in their order. Namely, citizens were satisfied more than normal with the chromacity of lighting at Cheomseongdae and Anapji, but more or less with those of Dongbu Sajeokji and Gyerim, and less with that of Banwolseong (Refer to Table 5).

2) Satisfaction with the Sample zone at Night

(1) Overall Satisfaction with the Sample Zone

The overall satisfaction with the sample zone at night (Y2) scored 2.981 on average, which suggests that citizens were less satisfied with the sample zone at night.

(2) Variables of Satisfaction with the Sample Zone at Night

The average score of safety of the overall luminance (X1) was 3.319, higher than normal, while that of charm of lighting color tone (X7) was 3.282, and that of comfort of lighting color tone (X8) was 3.185.

Table 6. Satisfaction with the sample zone at night

Item	Mean (SD)
X1	3.282 (0.898)
X2	3.624 (0.883)
X3	3.215 (1.028)
X4	2.921 (0.976)
X5	3.182 (0.859)
X6	3.267 (0.878)
X7	3.319 (0.829)
X8	3.185 (0.873)
X9	3.133 (0.874)
Y2	2.981 (0.963)

The average score of the lighting as a sight-seeing element (X2) was 3.624, while that of charm of lighting (X3) was 3.215, both being higher than normal.

The distinction of such amenities as bench or waste box (X4) scored 2.921 on average, which suggests that citizens felt it inconvenient to find them at night. On the other hand, the distinction of the obstacles to passage (X5) scored 3.182 on average, higher than normal.

The harmony between lighting and vegetation (X6) scored 3.267 on average, while that between lighting and building and facilities (X9) scored 3.133 on average, both higher than normal (Refer to Table 6).

V. Conclusions

The purpose of this study was to survey Wolseong Zone among Gyeongju historic areas for its outdoor landscape lighting and thereupon, analyze citizens' satisfaction with the zone at night and thereby, provide for some basic data useful to the solutions to citizens' inconveniences and the improvement of the lighting system at night.

The overall satisfaction with Anapji scored 3.739 on average, and particularly, 8 variables of the sub-zone scored higher than those of the other 4 sub-zones. In particular, citizens were most satisfied with the nightscape of the zone, while being least satisfied with the originality of the outdoor landscape lighting.

The overall satisfaction with Banwolseong scored 3.345 on average, while that with Dongbu Sajeokji scored 3.286. In case of these two sub-zones, citizens were more or less satisfied with 6 variables out of the total 9 ones, but less satisfied with

the other 3 variables. In these sub-zones, citizens were most satisfied with the changed image of the nightscape, while being least satisfied with the originality of the nightscape.

The overall satisfaction with Cheomseongdae scored 3.535 on average, and particularly, 8 variables of the sub-zone scored lower than the normal level. Citizens were most satisfied of the lighting, while being least satisfied with the originality of the nightscape.

The overall satisfaction with Gyerim scored 3.334 on average, and particularly, 7 variables of the sub-zone scored a normal level and the other 2 variables scored lower than the normal level. In particular, citizens were most satisfied with the changed image of the nightscape, while being least satisfied with the originality of the nightscape.

As discussed above, citizens were satisfied more with the changed image of the nightscape in the sample zone but less satisfied with the originality of the nightscape.

The overall satisfaction with the sample zone at night scored 2.981, lower than the normal level. Citizens were most satisfied with the outdoor landscape lighting as a sight-seeing element. On the other hand, the distinction of such amenities as bench or waste box scored lowest, while the charm of the lighting color tone scored high. Such findings may suggest that almost all of the outdoor landscape lighting do not effectively cover the peripheral spaces because they are inserted lights or floodlights.

Hence, more floodlights (all-around lights) need to be installed for parking lots, rest rooms, benches, and so on. In addition, types of lights and color tones and luminance of the light sources should be varied depending on the nature of the space: aqua space (Anapji), tombs (Daenenungwon), forest (Gyerim) or cultural asset (Cheomseongdae). Besides, the conventional types of lighting fixture installed in the sample zone need to be replaced with some original ones representing Gyeongju Historic Areas.

Within a short period of time, the outdoor landscape lightings have been installed hastily to meet the explosive demands, while the lighting companies have competed fiercely with each other. The outdoor landscape lighting in other cities may well be simply brighter, more colorful and impressive, but it needs to be softer and more original in Cultural Areas not to make visitors feel bored or inconvenient. Lastly, it is hoped that this study will provide for some basic data useful to develop a desirable and satisfactory nightscape for other Gyeongju cultural areas still not equipped with the outdoor landscape lighting and thereby, highlight culture, history and symbol of the historic city.

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