

**The apprehension of Lanna Arts and Culture of  
Tertiary Level Students**

**By**

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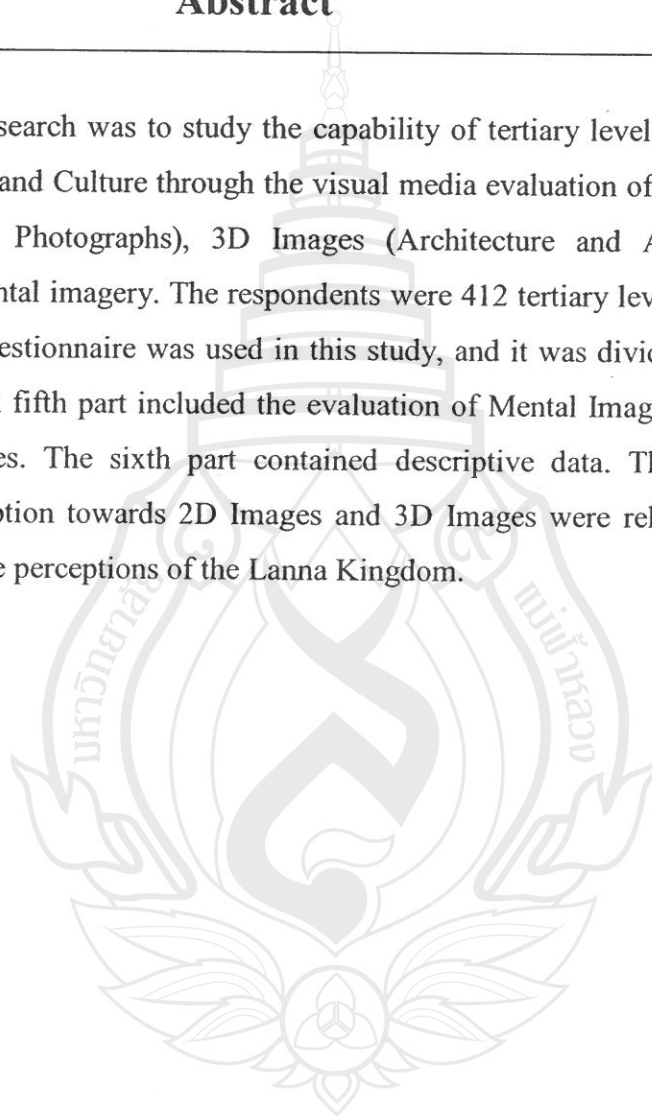
# The apprehension of Lanna Arts and Culture of Tertiary Level Students

Tawipas Pichaichanarong and Pollawat Prapatthong

## Abstract

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The purpose of this research was to study the capability of tertiary level students to apprehend Lanna Arts and Culture through the visual media evaluation of 2D Images (Graphic images and Photographs), 3D Images (Architecture and Architecture Visualization), and mental imagery. The respondents were 412 tertiary level students. A self-administered questionnaire was used in this study, and it was divided into six parts. The first through fifth part included the evaluation of Mental Imagery and 2D Images and 3D Images. The sixth part contained descriptive data. The findings showed that the perception towards 2D Images and 3D Images were related to the students having positive perceptions of the Lanna Kingdom.

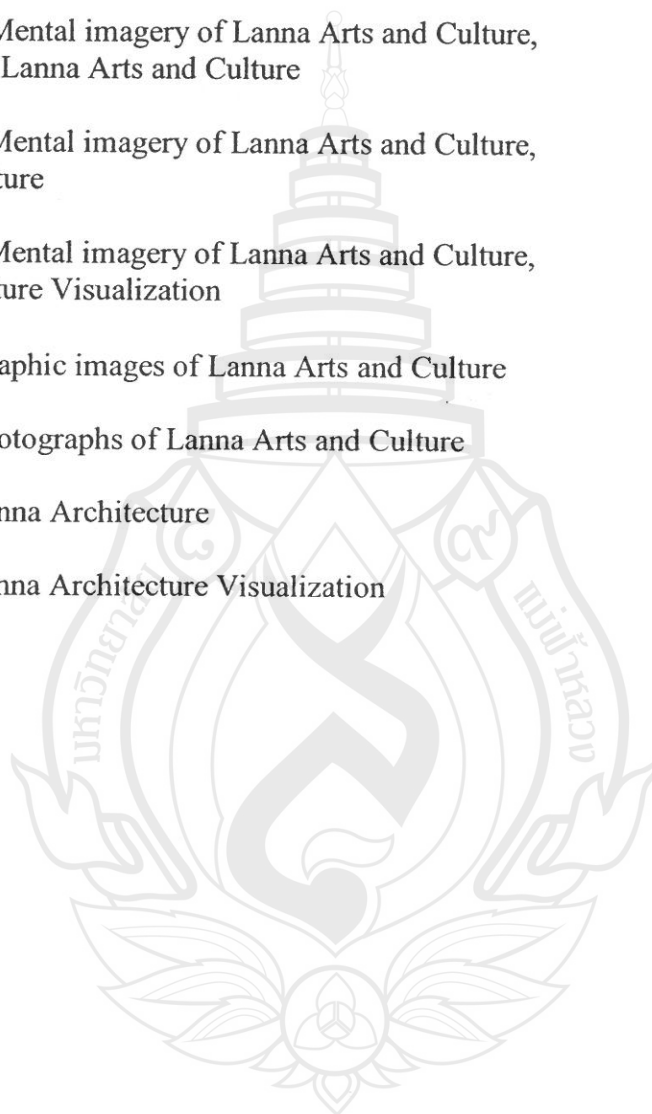


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## CHAPTER 1

### INTRODUCTION

#### 1.1 Statement and significance of the problem

Entering the 21th Century, contemporary young Thai students have been losing interest in Thai Arts and Culture. Art and Culture has been the bedrock of the Thai identity for a long time.

Continued ignorance of Thai Arts and Culture in the young Thai generation could affect the prosperity of Thai Arts and Culture in the future. In fact, the young Thai generation is the bridge to pass on this knowledge to the next Thai generations.

This research focuses on Lanna Arts and Culture, which represents the Northern part of Thailand, which is known as “the Kingdom of Lanna.” The Lanna region consists of 8 provinces (Chiang Mai, Chiang Rai, Lamphun, Lamphun, Payao, Phrae, Nan and Mae Hong Son).

The objective of this research is to investigate the capability of tertiary level students the apprehend Lanna Arts and Culture through the visual media evaluation of 2D Images (Graphic and Photographs of Lanna Arts and Culture) and 3D Images (Lanna Architecture and Lanna Architecture Visualization), and to see if they relate with Mental imagery bound in positive perceptions of the Lanna Kingdom.

When the knowledge of Lanna Arts and Culture achieves a more positive level among tertiary level students, it will lead to more positive perception towards The Lanna Kingdom. Therefore, more positive perceptions of the Lanna Kingdom would strengthen their perceptions of Thai Arts and Culture.

Key words: Lanna Arts and Culture, Thai Arts and Culture, Apprehension, Perception

## 1.2 Objective

The objectives of this study are:

1. To survey about the apprehension of Lanna Arts and Culture by tertiary level students.
2. To develop understandings of how Visual Communication, Visual Culture, Mental Imagery, Priming, Social Learning Theory, Theory of Persuasion crosses a variety of medium (2D and 3D Images) and could provide some sense of appreciation for Lanna Arts and Culture in the tertiary level students.

## 1.3 Scope of study

1. This study examined whether or not evaluation of 2D Images (Graphic Images and Photographs) were related to positive perceptions of the Lanna kingdom.
- 2 This study examined whether or not evaluation of 3D Images (Architecture and Architecture Visualization) were related to positive perceptions of the Lanna kingdom.

## CHAPTER 2

### LITERATURE REVIEW

#### VISUAL COMMUNICATIONS

Visual Communications is an exploration of the idea that memorable visual messages with text have the greatest power to inform, educate, and persuade an individual (Martin, 2008). The study of visual communication theory is a multi-disciplinary and multi-dimensional effort. People who write on this topic come from mass communication, film and cinema studies, education, art, anthropology, psychology, philosophy, linguistics, semiotics, architecture, and archaeology among other fields (Moriarty, 2008).

#### Gestalt

The gestalt theory of visual perception emerged from a simple observation. German psychologist Max Wertheimer received his inspiration during a train trip in the summer of 1910. Wertheimer happened to look out the window as the train moved through the sunny German countryside. He suddenly realized that he could see the outside scene even though the opaque wall of the train and the window frame partially blocked his view. He left the train in Frankfurt, went to a toy store, and bought a popular children's toy of the day—a stroboscope or flipbook. The flipbook is a simple form of cartoon animation. On the first page of the book, a drawing say, of a cartoon character in a running position—is displayed on the left-hand side of the page. On each subsequent page, the drawing of the figure is to the right of the previous drawing until the last page shows the character at the right-hand side of the page.

To see the effect of the character running from the left to the right side, the viewer simply flips the pages rapidly. Wertheimer's observations during the train trip and using the flipbook led to a famous laboratory experiment at the University of Frankfurt. Wertheimer concluded that the eye merely takes in all the visual stimuli and that the brain arranges the sensations into a coherent image. Without a brain that links individual sensual elements, the phenomenon of movement would not take



places. His ideas led to the famous statement: The whole is different from the sum of its parts. In other words, perception is a result of a combination of sensations and not of individual sensual elements (Lester, 2006): .

## VISUAL CULTURE

The paradox of visual culture is that it is everywhere and nowhere at once. We live in a world saturated with screens, images and objects, all demanding that we look at them. Work is mediated by screens and demands the virtuoso skills of a performing artist. Religions create spectacles of veiled women or of anti-evolution theme parks. At the same time, scholars of visual culture remind us that there is no such thing as a visual medium because all media are necessarily mixed. That is why the field is properly called visual culture, not visual media studies or visual studies. It compares the means by which cultures visualize themselves in forms ranging from the imagination to encounters between people and visualized media. In fact, visual culture is interested in sight only when it becomes vision, not as a physiological or neurological process, except when those sciences transform the broader understanding of the human.

In this view, vision is never singular but involves all the senses and modes of psychology. Sight is never experienced in the pure state as something that might be called “the” visual but is always rendered as vision, involving not just sensory data but the modulating frames of psychology, whether in terms of the conscious or unconscious mind.

Visual culture is everywhere: all around us are screens on computers, game consoles, iPods, handheld devices and televisions, far outnumbering those used by the still-healthy cinema industry. Still- and moving-image cameras are ubiquitous, from personal and professional image making to closed circuit surveillance systems and intranets (Mirzoeff, 2009).

## MENTAL IMAGERY

Mental imagery (varieties of which are sometimes colloquially referred to as “visualizing,” “seeing in the mind's eye,” “hearing in the head,” “imagining the feel of,” etc). is *quasi-perceptual experience*; it resembles perceptual experience, but occurs in the absence of the appropriate external stimuli.

It is also generally understood to bear *intentionality* (i.e., mental images are always images *of* something or other), and thereby to function as a form of mental representation. Traditionally, *visual* mental imagery, the most discussed variety, was thought to be caused by the presence of picture-like representations (*mental images*) in the mind, soul, or brain, but this is no longer universally accepted. (Retrieved April 2, 2010 from the World Wide Web: [http://plato.stanford.edu/entries/mental-imagery/.](http://plato.stanford.edu/entries/mental-imagery/))

Mental imagery, also called visualization and mental rehearsal, is defined as experience that resembles perceptual experience, but which occurs in the absence of the appropriate stimuli for the relevant perception.

Imagination; Visualization; Perception in visual absence of object.

- 1.Quantity: number of mental images generated
- 2.Ease: effort required
- 3.Vividness: clarity and detail of images

## LANNA ARTS AND CULTURE

### Lanna Origin

Current evidence suggests that the first Thai groups appeared in the far north of the present-day country nearly a thousand years ago. Some of them settled into fertile valleys along rivers that flowed through the rugged, misty mountains, forming small principalities, which slowly grew in both population and power.

By the mid-13<sup>th</sup> century, there were enough principalities to unite under an ambitious ruler known as Mangrai and form a kingdom called Lanna that extended from Laos to what is now the Shan States of Burma, with Chiang Mai as its capital city.

Lanna can thus be seen as one of the original seats of Thai culture. It was also one of the last to be affected by external forces that so dramatically changed the rest of the country. While other more powerful Thai states like Sukhothai, Ayutthaya, and Bangkok rose and flourished to the south, Lanna remained a place apart, with its own royal family and its own traditions, more or less sealed off by a range of lofty mountains that prevented easy access by outsiders. Active involvement in day-to-day administration from Bangkok came only in the late 19<sup>th</sup> century with the appointment of a Siamese High Commissioner, but not until the northern railway line reached Chiang Mai in the 1920s did others really begin to come to the region (Amranand & Warren, 2000).

#### Lanna Art & Architecture

As elsewhere, Lanna Art was religious in inspiration and function, and for this reason it is essential to consider the architecture of its monuments and monastic building at the same time as its sculpture and mural painting (Freeman, 2001).

#### PRIMING

Priming refers to enhancing the effects of the media by offering the audience a prior context: a context that will be used to interpret subsequent communication. The media serves to provide the audience with standards and frames of reference. Agenda-setting refers mainly to the importance of an issue; priming tells us whether something is good or bad, whether or not it is communicated effectively, and so on (Retrieved December 30, 2008 from the World Wide Web:

<http://www.tcw.utwente.nl/theorieenoverzicht/Theory> ).

#### SOCIAL LEARNING THEORY

People learn through observing others' behavior, attitudes, and outcomes of those behaviors. "Most human behavior is learned observationally through modeling: from observing others, one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action." (Bandura, 1997).

Social learning theory explains human behavior in terms of continuous reciprocal interaction between cognitive, behavioral, and environmental influences.

Necessary conditions for effective modeling:

1. Attention — various factors increase or decrease the amount of attention paid. Includes distinctiveness, affective valence, prevalence, complexity, functional value. One's characteristics (e.g. sensory capacities, arousal level, perceptual set, past reinforcement) affect attention.
2. Retention — remembering what you paid attention to. Includes symbolic coding, mental images, cognitive organization, symbolic rehearsal, and motor rehearsal.
3. Reproduction — reproducing the image, including physical capabilities, and self-observation of reproduction.
4. Motivation — having a good reason to imitate. This includes motives such as past (i.e. traditional behaviorism), promised (imagined incentives), and vicarious (seeing and recalling the reinforced model).

### **THEORY OF PERSUASION**

In 1953, Hovland, Janis, and Kelly defined persuasive communication as “the process by which an individual (the communicator) transmits stimuli (usually verbal) to modify the behavior of other individuals (the audience)” (Tan, 1985).

This study investigated five characteristics of communication sources: attractiveness, believability, liking, persuasion, and trustworthiness as applied to the apprehension of Lanna' arts and culture by tertiary level students. It attempts to better understand perceived differences and similarities between Mental Imagery and Lanna Arts and Culture in 2D Images (Graphic images, and Photographs) and in 3D Images (Lanna Architecture and Lanna Architecture Visualization).

This study tests the following hypothesis: **H-1:** The apprehension of Lanna Arts and Culture of Tertiary Level Students



## CHAPTER 3

### METHODOLOGY

Participants: Subjects were recruited from various undergraduate level classes at a large university in the Northern Province of Thailand. They were given extra credit for participation. The instructor told the students that this was a study analyzing people's opinions and feeling about the apprehension of public issues in Thailand today, particularly issues dealing with Lanna Arts and Culture.

#### Tool of Measurement

The participants' responses were measured by scales adapted from Bucholz and Smith (1991). The nine-point differential scale asks respondents to rate whether categories of Lanna Arts and Culture are closer to one or the other of two bipolar adjectives. Our measurements included twelve attributes (shown in Figure 1), using a Likert scale ranging from 1 (very disagree) to 9 (very agree).

This study was also interested in the portrayals of Lanna Arts and Culture in various mediums. The current study examined the students' viewing frequency of television, movie, and internet (e.g., hours per week). This survey also measured how television, movie, and internet portrayals are recalled and perceived.

#### PROCEDURES

To test the hypothesis, information was gathered by a questionnaire with the consent of the student. To ensure instrument reliability and to prevent respondent sensitization, respondents were instructed to answer the questionnaire with conditions of Lanna Arts and Culture in general, and of Lanna Arts and Culture in 2D Images and 3D Images.

## CHAPTER 4

### RESULTS

#### PARTICIPANTS AND MEASUREMENTS

Four-hundred and twelve students participated in the study. 39.5 percent were male, and 60.5 percent were females. The average age was 21.22 years. 57.6 percent were freshman, and 20.1 percent were sophomores. 13.3 percent were juniors, 6.3 were seniors, and 1.9 percent were graduate students. Business Chinese majors made up the highest number of students at 34.6 percent. 5.6 percent of the college students watched television at the highest average of 0-5 hours per week. 4.1 percent of the college students watched movies at the highest average of 0-5 hours per week. 7.3 percent read newspapers for 0-5 hours per week. 5.6 percent of the college students read magazines 0-5 hours per week, and 4.8 percent used the Internet at the highest average of  $\geq 30$  hours per week.

#### TEST OF HYPOTHESIS

To test the hypothesis, correlation analyses were used to estimate the relationships between the conditions of the experts of Lanna Arts and Culture and the Tertiary Level Students. This study tested the apprehension of Lanna Arts and Culture for the Tertiary Level Students compared with the experts by their evaluations of Lanna Arts and Culture in 2D Images and in 3D Images.

**H-1** predicted the apprehension of Lanna Arts and Culture for the Tertiary Level Students. To test H-1, correlations were computed between:

- The correlation of Mental imagery of Lanna Arts and Culture with Graphic images of Lanna Arts and Culture;
- The correlation of Mental imagery of Lanna Arts and Culture with Photographs of Lanna Arts and Culture;
- The Correlation of Mental imagery of Lanna Arts and Culture with Lanna Architecture;

- The Correlation of Mental imagery of Lanna Arts and Culture with Lanna Architecture Visualization

The hypothesis was significant at .000 (see Table 1-4).

**TABLE 1**

**Correlation of Mental Imagery of Lanna Arts and Culture, Graphic images of Lanna Arts and Culture**

	Mean Mental Imagery	Mean Graphic images	Correlation	
			r	Sig. (2-tailed)
1.Beautiful	7.81	7.36	.383	.000*
2.Attractive	7.40	7.19	.378	.000*
3.Noble	7.24	6.85	.460	.000*
4.Appreciate	7.25	7.08	.414	.000*
5.Northern Arts	7.97	7.32	.346	.000*
6.Northern Culture	7.93	7.40	.328	.000*
7.Thai Arts	7.90	7.39	.428	.000*
8.Original	7.38	6.82	.368	.000*
9.Believable	7.44	6.86	.292	.000*
10.Likable	7.28	6.93	.432	.000*
11.Persuasive	7.21	6.94	.362	.000*
12.Trustworthy	7.22	6.88	.357	.000*

Correlation is significant at the 0.05 level.



**TABLE 2**  
**Correlation of Mental Imagery of Lanna Arts and Culture, Photographs of Lanna Arts and Culture**

	Mean Mental Imagery	Mean Photographs	Correlation	
			r	Sig. (2-tailed)
1.Beautiful	7.81	7.78	.020	.680
2.Attractive	7.40	7.47	.046	.353
3.Noble	7.24	7.35	.103	.037*
4.Appreciate	7.25	7.33	.095	.056
5.Northern Arts	7.97	7.69	-.043	.384
6.Northern Culture	7.93	7.69	-.085	.087
7.Thai Arts	7.90	7.63	.068	.167
8.Original	7.38	7.36	.114	.021*
9.Believable	7.44	7.36	.041	.406
10.Likable	7.28	7.30	.040	.416
11.Persuasive	7.21	7.31	.038	.443
12.Trustworthy	7.22	7.31	.025	.608

Correlation is significant at the 0.05 level.

**TABLE 3**  
**Correlation of Mental Imagery of Lanna Arts and Culture, Lanna Architecture**

	Mean Mental Imagery	Mean Lanna Architecture	Correlation	
			r	Sig. (2-tailed)
1.Beautiful	7.81	8.11	.485	.000*
2.Attractive	7.40	8.07	.502	.000*
3.Noble	7.24	8.24	.154	.270
4.Appreciate	7.25	7.23	.106	.457
5.Northern Arts	7.97	8.01	.080	.569
6.Northern Culture	7.93	7.88	.132	.354
7.Thai Arts	7.90	7.80	-.033	.821
8.Original	7.38	7.15	.024	.862
9.Believable	7.44	7.75	.052	.710
10.Likable	7.28	7.96	.274	.047*
11.Persuasive	7.21	6.03	.084	.549
12.Trustworthy	7.22	7.30	.014	.920

Correlation is significant at the 0.05 level.

**TABLE 4**  
**Correlation of Mental Imagery of Lanna Arts and Culture, Lanna Architecture Visualization**

	Mean Mental Imagery	Mean Lanna Architecture Visualization	Correlation	
			r	Sig. (2-tailed)
1.Beautiful	7.81	7.86	.189	.185
2.Attractive	7.40	7.78	.262	.063
3.Noble	7.24	7.64	-.043	.765
4.Appreciate	7.25	7.78	-.034	.816
5.Northern Arts	7.97	7.62	.053	.710
6.Northern Culture	7.93	7.64	.030	.837
7.Thai Arts	7.90	7.49	-.020	.893
8.Original	7.38	6.94	.120	.402
9.Believable	7.44	7.05	-.226	.111
10.Likable	7.28	7.66	-.049	.734
11.Persuasive	7.21	6.54	.054	.706
12.Trustworthy	7.22	7.19	-.053	.713

Correlation is significant at the 0.05 level.

## CHAPTER 5

### CONCLUSION AND DISCUSSION

#### CONCLUSION

We examined that the apprehension of Lanna Arts and Culture for the Tertiary Level Students compared with the experts of Lanna Arts and Culture by using the *t* test. A paired *t* test showed that the Tertiary Level Students apprehended Lanna Arts and Culture like the experts of Lanna Arts and Culture. A higher mean on a scale of 1 to 9 implied that the level of apprehension for the Tertiary Level Students were like most of the experts.

12 attribute descriptions were scored: beautiful, attractive, noble, appreciate, northern arts, northern culture, Thai arts, original, believable, likable, persuasive, and trustworthy. A paired *t* test showed that the apprehension of Lanna Arts and Culture for Tertiary Level Students compared with the experts (shown in Table 5- 8). There were no significant differences ( $p \geq 0.05$ ) in all scores for various attributes of the 12 attribute descriptions.

In addition, the *p* values of all Tables pointed in the same directions. These findings supported that the Tertiary Level Students understood Lanna Arts and Culture the same as the experts did.

**TABLE 5**  
Paired *t* Test Graphic images of Lanna Arts and Culture

	<i>t</i> value	p value
Beautiful (Tertiary Students)		
Beautiful (Experts of Lanna Arts and Culture)	-.017	.171
Attractive (Tertiary Students)		
Attractive (Experts of Lanna Arts and Culture)	-.260	.791
Noble (Tertiary Students)		
Noble (Experts of Lanna Arts and Culture)	.219	.129
Appreciate (Tertiary Students)		
Appreciate (Experts of Lanna Arts and Culture)	.546	.143
Northern Arts (Tertiary Students)		
Northern Arts (Experts of Lanna Arts and Culture)	.336	.191
Northern Culture (Tertiary Students)		
Northern Culture (Experts of Lanna Arts and Culture)	.456	.616
Thai Arts (Tertiary Students)		
Thai Arts (Experts of Lanna Arts and Culture)	1.308	.842
Original (Tertiary Students)		
Original (Experts of Lanna Arts and Culture)	-.222	.664
Believable (Tertiary Students)		
Believable (Experts of Lanna Arts and Culture)	.626	.011
Likable (Tertiary Students)		
Likable (Experts of Lanna Arts and Culture)	.323	.120
Persuasive (Tertiary Students)		
Persuasive (Experts of Lanna Arts and Culture)	.279	.110
Trustworthy (Tertiary Students)		
Trustworthy (Experts of Lanna Arts and Culture)	.669	.007

**TABLE 6**  
**Paired *t* Test Photographs of Lanna Arts and Culture**

	<i>t</i> value	p value
Beautiful (Tertiary Students)		
Beautiful (Experts of Lanna Arts and Culture)	-.484	.841
Attractive (Tertiary Students)		
Attractive (Experts of Lanna Arts and Culture)	1.125	.005
Noble (Tertiary Students)		
Noble (Experts of Lanna Arts and Culture)	-.571	.011
Appreciate (Tertiary Students)		
Appreciate (Experts of Lanna Arts and Culture)	-.588	.285
Northern Arts (Tertiary Students)		
Northern Arts (Experts of Lanna Arts and Culture)	-.562	.992
Northern Culture (Tertiary Students)		
Northern Culture (Experts of Lanna Arts and Culture)	-.552	.988
Thai Arts (Tertiary Students)		
Thai Arts (Experts of Lanna Arts and Culture)	1.734	.439
Original (Tertiary Students)		
Original (Experts of Lanna Arts and Culture)	-.471	.246
Believable (Tertiary Students)		
Believable (Experts of Lanna Arts and Culture)	-.043	.807
Likable (Tertiary Students)		
Likable (Experts of Lanna Arts and Culture)	-.136	.870
Persuasive (Tertiary Students)		
Persuasive (Experts of Lanna Arts and Culture)	.380	.328
Trustworthy (Tertiary Students)		
Trustworthy (Experts of Lanna Arts and Culture)	-.129	.154

**TABLE 7**  
**Paired *t* Test Lanna Architecture**

	<i>t</i> value	p value
Beautiful (Tertiary Students)		
Beautiful (Experts of Lanna Arts and Culture)	-.214	.467
Attractive (Tertiary Students)		
Attractive (Experts of Lanna Arts and Culture)	-.860	.937
Noble (Tertiary Students)		
Noble (Experts of Lanna Arts and Culture)	.440	.190
Appreciate (Tertiary Students)		
Appreciate (Experts of Lanna Arts and Culture)	-1.221	.526
Northern Arts (Tertiary Students)		
Northern Arts (Experts of Lanna Arts and Culture)	-.064	.448
Northern Culture (Tertiary Students)		
Northern Culture (Experts of Lanna Arts and Culture)	-.033	.448
Thai Arts (Tertiary Students)		
Thai Arts (Experts of Lanna Arts and Culture)	1.133	.718
Original (Tertiary Students)		
Original (Experts of Lanna Arts and Culture)	-.064	.807
Believable (Tertiary Students)		
Believable (Experts of Lanna Arts and Culture)	-.629	.582
Likable (Tertiary Students)		
Likable (Experts of Lanna Arts and Culture)	.000	.781
Persuasive (Tertiary Students)		
Persuasive (Experts of Lanna Arts and Culture)	-.581	.338
Trustworthy (Tertiary Students)		
Trustworthy (Experts of Lanna Arts and Culture)	-.177	.835

**TABLE 8**  
**Paired *t* Test Lanna Architecture Visualization**

	<i>t</i> value	p value
Beautiful (Tertiary Students)		
Beautiful (Experts of Lanna Arts and Culture)	-.538	.742
Attractive (Tertiary Students)		
Attractive (Experts of Lanna Arts and Culture)	.161	.821
Noble (Tertiary Students)		
Noble (Experts of Lanna Arts and Culture)	-.193	.306
Appreciate (Tertiary Students)		
Appreciate (Experts of Lanna Arts and Culture)	-1.282	.600
Northern Arts (Tertiary Students)		
Northern Arts (Experts of Lanna Arts and Culture)	-1.310	.706
Northern Culture (Tertiary Students)		
Northern Culture (Experts of Lanna Arts and Culture)	-.832	.557
Thai Arts (Tertiary Students)		
Thai Arts (Experts of Lanna Arts and Culture)	1.441	.099
Original (Tertiary Students)		
Original (Experts of Lanna Arts and Culture)	-1.270	.408
Believable (Tertiary Students)		
Believable (Experts of Lanna Arts and Culture)	-.374	.567
Likable (Tertiary Students)		
Likable (Experts of Lanna Arts and Culture)	-.944	.302
Persuasive (Tertiary Students)		
Persuasive (Experts of Lanna Arts and Culture)	-1.685	.063
Trustworthy (Tertiary Students)		
Trustworthy (Experts of Lanna Arts and Culture)	-.996	.407



## DISCUSSION

The result supported the hypothesis. The apprehension of Lanna Arts and Culture of the Tertiary Level Students compared with that of the experts. It concluded that the Tertiary Level Students of this university apprehended Lanna Arts and Culture like the experts

In addition, we also concluded that the apprehension of Lanna Arts and Culture for the Tertiary Level Students were positive. It related to their positive perception of the Lanna Kingdom.

Bandura's social learning theory (1977) suggests that pertaining representations, sometimes referred to as visual imagery, involves drawing a mental picture of the observed act and storing that picture in our memories. Visual Imagery is of course quite a common process. We have "pictures in our heads" of people we know or have known; of experiences, sad and happy; of beautiful vacation scenes; and so on. Likewise, a person who had seen Lanna Arts and Culture in 2D and in 3D Image representations would recall positive images of the objects and would develop positive attitudes towards the Lanna Kingdom in general.

In addition, the portrayal of Lanna Arts and Culture in 2D Images (Graphic images and Photographs) and 3D Images (Lanna Architecture and Lanna Architecture Visualization) did not have more effect than Mental Imagery of Lanna Arts and Culture. Furthermore, the results reported that our respondents have placed 2D Images and Lanna Architecture Visualizations to be more effective mediums at significant level.

In conclusion, this study confirmed that 2D Images and Visualizations of Lanna Architecture were the most effective mediums. In addition, the positive perception of Lanna Arts and Culture in 2D and 3D Images were related to the positive perceptions of the Lanna Kingdom. However, Lanna Arts and Culture in 2D Images and in 3D Images had not created more effective images than Mental Imagery that is created by their own visualization (See Profile Figures 1-4).

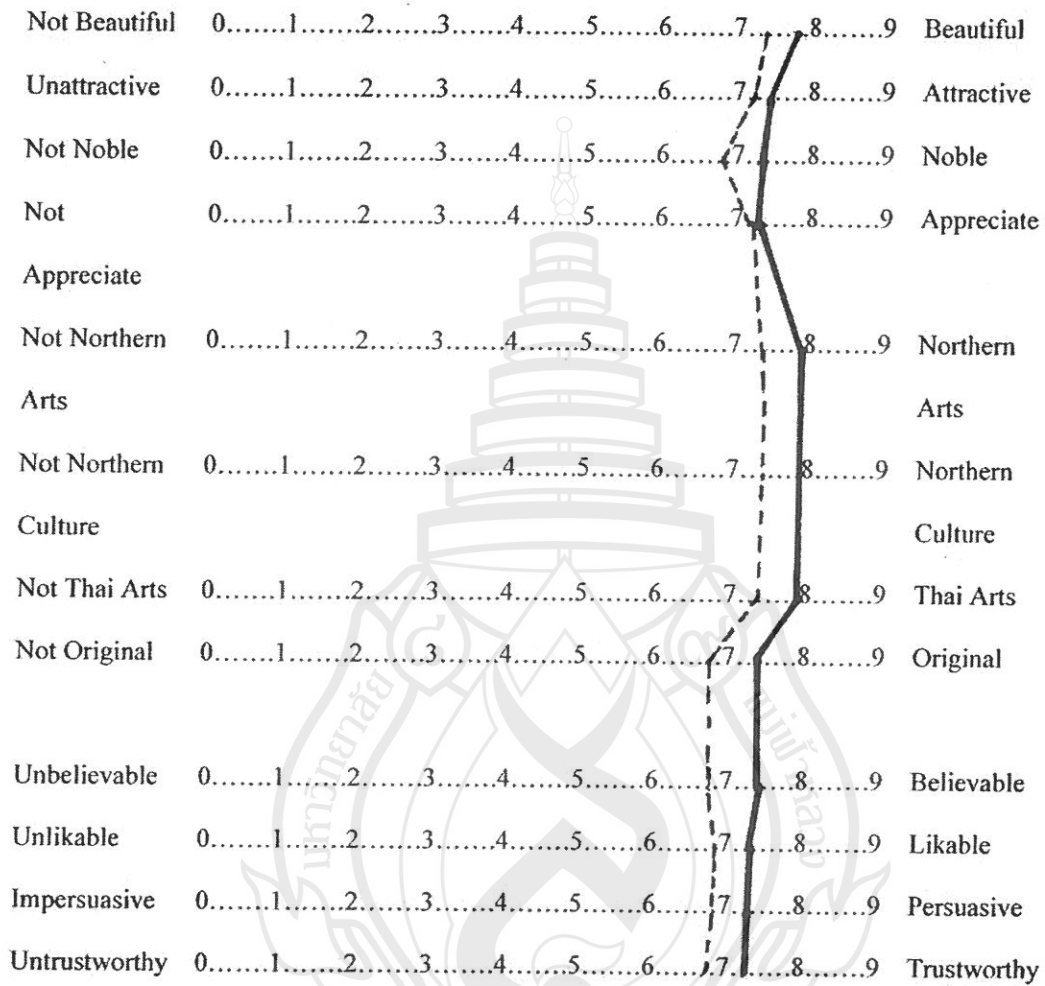
### LIMITATIONS

One of the drawbacks of this survey was the difficulty of collecting the data from tertiary level students. The survey has been converted into a digitized version. The data has been collected into a database and stored in a personal computer. It was designed for students to have more convenient access in order to participate in the survey. However, some of the students did not own a personal computer. Although four-hundred and twelve college students is not a representative sample of the entire adult population of Thailand, the participants did provide valuable data, which provided for a successful test of this research hypothesis.



**Figure 1**

**Profile of Mental imagery of Lanna Arts and Culture, Graphic images of Lanna Arts and Culture**

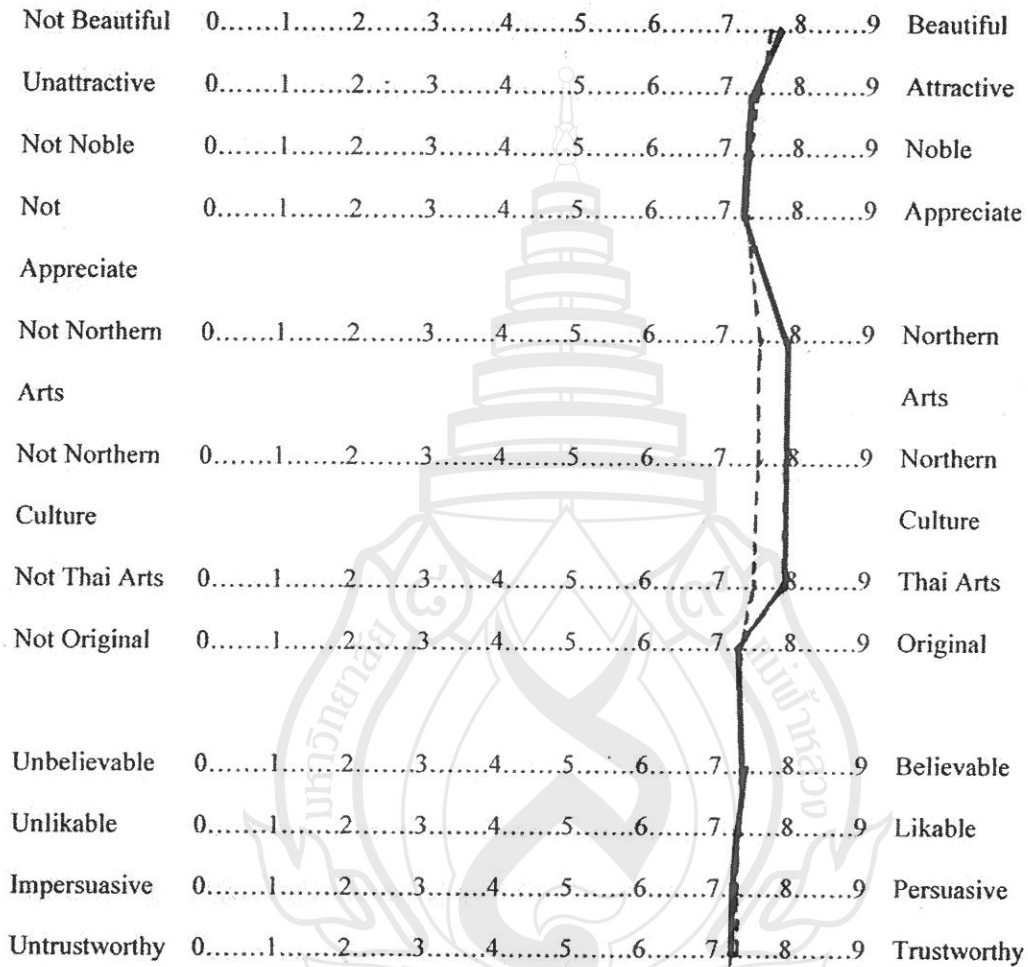


\_\_\_\_\_ : Mental Imagery of Lanna Arts and Culture

..... : Graphic images of Lanna Arts and Culture

**Figure 2**

**Profile of Mental imagery of Lanna Arts and Culture, Photographs of Lanna Arts and Culture**

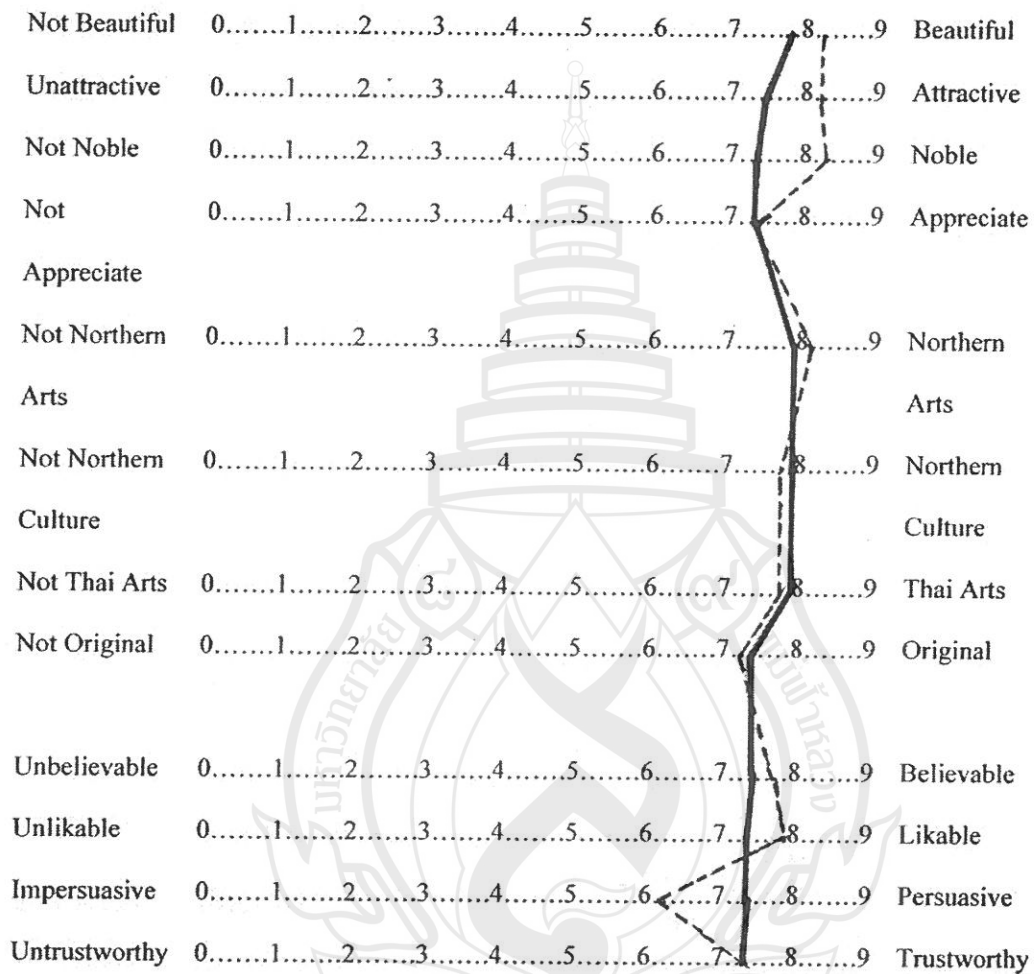


\_\_\_\_\_ : Mental Imagery of Lanna Arts and Culture

..... : Photographs of Lanna Arts and Culture

**Figure 3**

**Profile of Mental imagery of Lanna Arts and Culture, Lanna Architecture**

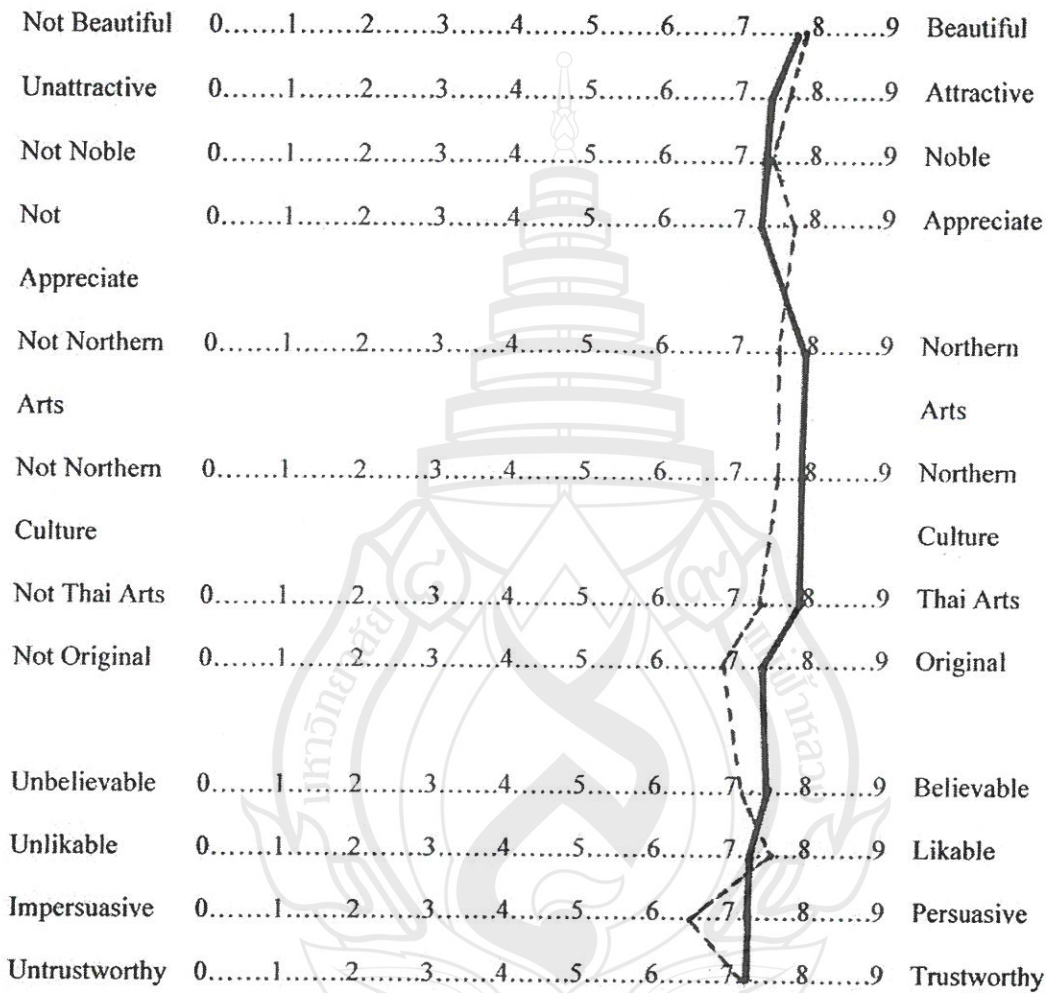


\_\_\_\_\_ : Mental Imagery of Lanna Arts and Culture

..... : Lanna Architecture

**Figure 4**

**Profile of Mental imagery of Lanna Arts and Culture, Lanna Architecture Visualization**



\_\_\_\_\_ : Mental Imagery of Lanna Arts and Culture

..... : Lanna Architecture Visualization

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**Statistic data for the tertiary level students who answered the questionnaire in this research.**

The tertiary level students come from five parts of Thailand and from other countries.

Northern region	Percent
N = 158	
Female	45.6
Male	54.4
Chiang Rai	41.1
Chiang Mai	19.0
Nan	4.4
Phayao	3.8
Phrae	6.3
Maehongson	0.6
Lampang	13.3
Lamphun	7.0
Uttaradit	4.4

Northeastern region	Percent
N = 32	
Female	46.9
Male	50.0
Khonkaen	9.4
Chaiyaphum	3.1
Nakhonratchasima	3.1
Buriram	6.3
Mukdahan	3.1
Yasothon	3.1
Roi Et	3.1
Loei	12.5
Nongkhai	3.1
Nongbualamphu	3.1
Udon Thani	31.3
Ubon Ratchathani	18.7

Western region	Percent
N = 7	
Female	42.9
Male	57.1
Kanchanaburi	14.3
Tak	42.9
Ratchaburi	42.9

Eastern region	Percent
N = 12	
Female	50.0
Male	50.0
Chanthaburi	16.7
Chachoengsao	25.0
Chonburi	25.0
Rayong	33.3

Southern region	Percent
N = 24	
Female	83.3
Male	16.7
Krabi	12.5
Chumphon	4.2
Nakhonsithammarat	8.3
Narathiwat	8.3
Pattani	16.7
Phatthalung	4.2
Phuket	4.2
Yala	8.3
Songkhla	16.7
Suratthani	16.7

Central region N = 90	Percent
Female	58.9
Male	41.1
Bangkok	35.6
Kamphaengphet	7.8
Chainat	1.1
Nakhonpathom	3.3
Nakhonratchasima	1.1
Nakhonsawan	10.0
Nonthaburi	2.2
Pathumthani	2.2
Ayutthaya	2.2
Phitsanulok	3.3
Phetchabun	5.6
Lopburi	2.2
Samutprakan	5.6
Samutsakhon	2.2
Saraburi	1.1
Sukhothai	8.9
Suphanburi	3.3
Uthaithani	2.2

International N = 3	Percent
Female	33.3
Male	66.7
Laos	33.3
Myanmar	66.7



## Mae Fah Luang University

### Please fill in the Questionnaire

The purpose of this study is to investigate the perceiving Lanna Arts and culture of Thai University students through Lanna Arts and Culture via media and visual images of graphic arts, photographs, Lanna Architecture, Lanna Architecture Visualization and student's own visualization (Mental Imagery).

The Medium that you will see divided into four separate categories:

1. Graphic Arts will represent Lanna Arts and Culture
2. Photographs will represent Lanna Arts and Culture
3. Lanna Architecture will represent Lanna Arts and Culture
4. Lanna Architecture Visualization will represent Lanna Arts and Culture

**There will be 66 images and will show approximately three minutes (3 mins) long.**

All information you share with us will remain anonymous and cannot be traced back to you not any other individual.

This project has been reviewed and approved by the **Division of Research Services, Mae Fah Luang University**; their number is (0-5391-6389).

If you have any questions regarding this research please call Aj. Tawipas Pichaichanarong(0-53916745).

Your participation in this study will be a great help in understanding public perception about the Visual communication through the Media and Mental Imagery.

Thank you very much for your participation.

<b>Student ID:</b>	
<b>Age:</b>	
<b>Gender</b>	<input type="radio"/> Male <input type="radio"/> Female
<b>Level:</b>	<input type="checkbox"/> Freshman <input type="checkbox"/> Sophomore <input type="checkbox"/> Junior <input type="checkbox"/> Senior <input type="checkbox"/> Graduate
<b>Major:</b>	
<b>E-mail:</b>	
<b>University:</b>	Mae Fah Luang University

**Part I**

Please visualize of Lanna Arts and Culture in general. Check a space between each of the adjectives below to indicate how you would describe Lanna Arts and Culture in general.

For example, if you thought Lanna Arts and Culture are “Somewhat” in general, you would check the space between “Attractive” and “Unattractive” as shown below.

	Ver y	Ver y	Quit e	Som e what	Neithe r	Som e what	Quit e	Ver y	Ver y	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Beautiful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Beautiful
Attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unattractive
Noble	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Noble
Appreciate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Appreciate
Northern Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Northern Arts
Thai Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Thai Arts
Original	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Original
Believable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unbelievable
Likable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unlikable
Persuasive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ImPersuasive
Trustworth y	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Untrustworth y

## Part II

Please visualize of Graphic images of Lanna Arts and Culture that you have seen. Check a space between each of the adjectives below to indicate how you would describe Graphic images of Lanna Arts and Culture. For example, if you thought Graphic images of Lanna Arts and Culture are “Somewhat” in general, you would check the space between “Attractive” and “Unattractive” as shown below.

	Ver y	Ver y	Quit e	Som e what	Neithe r	Som e what	Quit e	Ver y	Ver y	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Beautiful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Beautiful
Attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unattractive
Noble	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Noble
Appreciate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Appreciate
Northern Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Northern Arts
Thai Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Thai Arts
Original	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Original
Believable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unbelievable
Likable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unlikable
Persuasive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ImPersuasive
Trustworth y	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Untrustworth y

**Part III**

Please visualize of Photographs of Lanna Arts and Culture that you have seen. Check a space between each of the adjectives below to indicate how you would describe Photographs of Lanna Arts and Culture. For example, if you thought Photographs of Lanna Arts and Culture are “Somewhat” in general, you would check the space between “Attractive” and “Unattractive” as shown below.

	Ver y	Ver y	Quit e	Som e what	Neithe r	Som e what	Quit e	Ver y	Ver y	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Beautiful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Beautiful
Attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unattractive
Noble	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Noble
Appreciate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Appreciate
Northern Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Northern Arts
Thai Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Thai Arts
Original	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Original
Believable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unbelievable
Likable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unlikable
Persuasive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ImPersuasive
Trustworth y	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Untrustworth y

Part IV

Please visualize of Lanna Architecture (Lanthong Vihara) that you have seen. Check a space between each of the adjectives below to indicate how you would describe Lanna Architecture (Lanthong Vihara). For example, if you thought Lanna Architecture (Lanthong Vihara) are “Somewhat” in general, you would check the space between “Attractive” and “Unattractive” as shown below.

	Ver y	Ver y	Quit e	Som e	Neithe r	Som e	Quit e	Ver y	Ver y	
	Ver y			what		what			Ver y	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Beautiful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Beautiful
Attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unattractive
Noble	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Noble
Appreciate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Appreciate
Northern Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Northern Arts
Thai Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Thai Arts
Original	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Original
Believable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unbelievable
Likable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unlikable
Persuasive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ImPersuasive
Trustworth y	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Untrustworth y



## Part V

Please visualize of Lanna Architecture Visualization (Lanthong Vihara in 3D) that you have seen. Check a space between each of the adjectives below to indicate how you would describe Lanna Architecture Visualization (Lanthong Vihara in 3D). For example, if you thought Lanna Architecture Visualization (Lanthong Vihara in 3D) are “Somewhat” in general, you would check the space between “Attractive” and “Unattractive” as shown below.

	Ver y	Ver y	Quit e	Som e what	Neithe r	Som e what	Quit e	Ver y	Ver y	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Beautiful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Beautiful
Attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unattractive
Noble	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Noble
Appreciate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Appreciate
Northern Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Northern Arts
Thai Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Thai Arts
Original	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Not Original
Believable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unbelievable
Likable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unlikable
Persuasive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ImPersuasive
Trustworth y	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Untrustworth y

**Part VI**

Here are some questions about your use of television, movies, newspapers, magazines, and the Internet.

1. On average, how many hours of Television do you watch in week?

- 0-5       11 - 15       21-25        $\geq 30$   
 6-10       16 - 20       26-30

2. On average, how many hours of Movies do you watch in week?

- 0-5       11 - 15       21-25        $\geq 30$   
 6-10       16 - 20       26-30

3. On average, how many hours of Newspapers do you read in week?

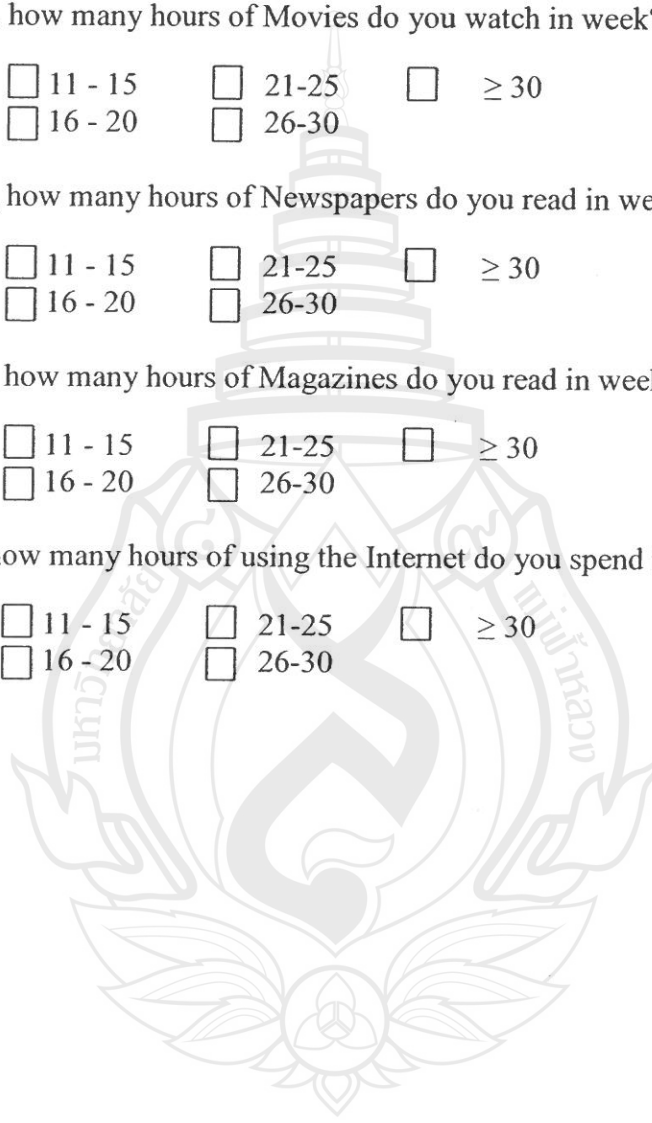
- 0-5       11 - 15       21-25        $\geq 30$   
 6-10       16 - 20       26-30

4. On average, how many hours of Magazines do you read in week?

- 0-5       11 - 15       21-25        $\geq 30$   
 6-10       16 - 20       26-30

5. On average, how many hours of using the Internet do you spend in week?

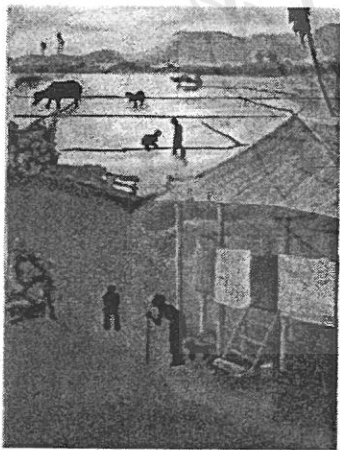
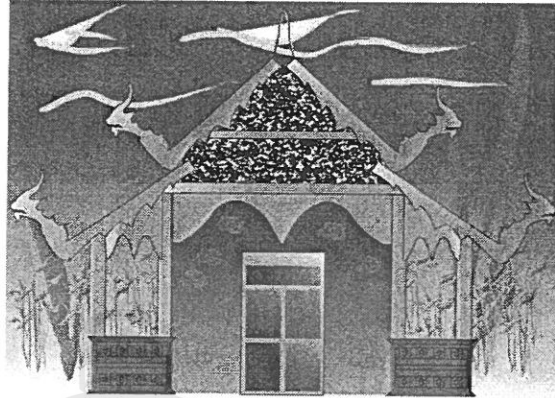
- 0-5       11 - 15       21-25        $\geq 30$   
 6-10       16 - 20       26-30



### IMAGE SAMPLES IN THIS RESEARCH Graphic Images

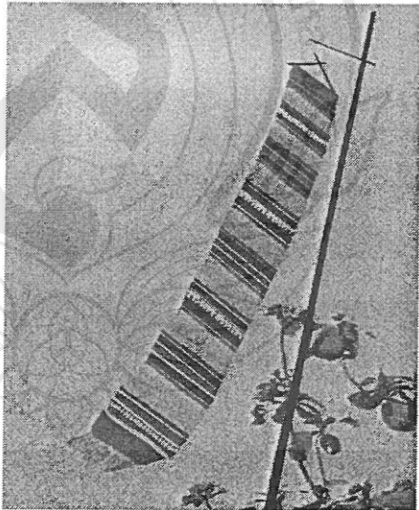
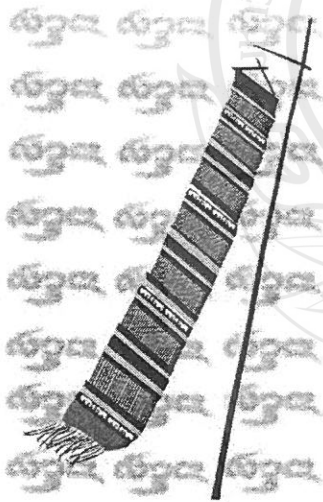
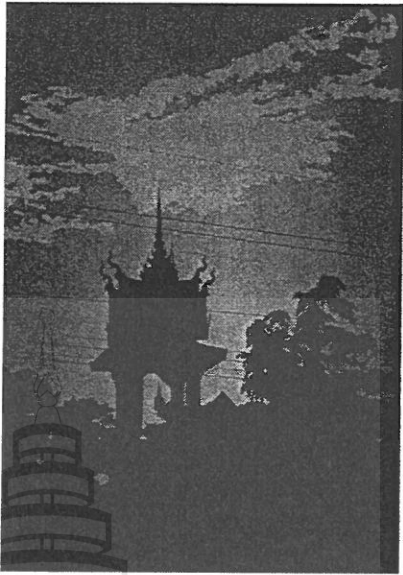
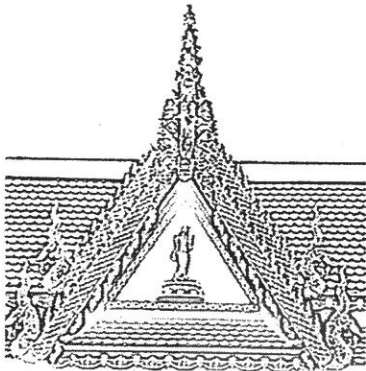


Lanna Illustrator  
P. Thuanee 4831306010

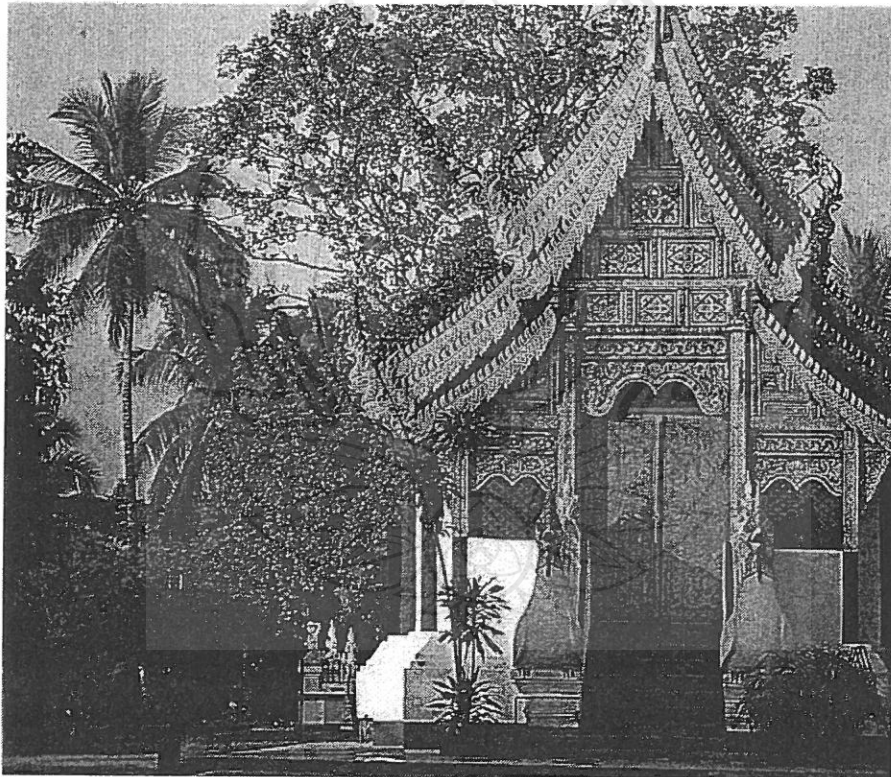


Lanna





Photographs





Graphic images were created by the 2nd year Multimedia Technology and Animation Students (ID 49), Mae Fah Luang University.

Photographs were partly from the book Title  
"Lanna Style: Art & Design of Northern Thailand"  
Author: Ping Amranand, photographer  
Alt Author: Warren William  
Imprint: Bangkok; Asia Books, 2000.

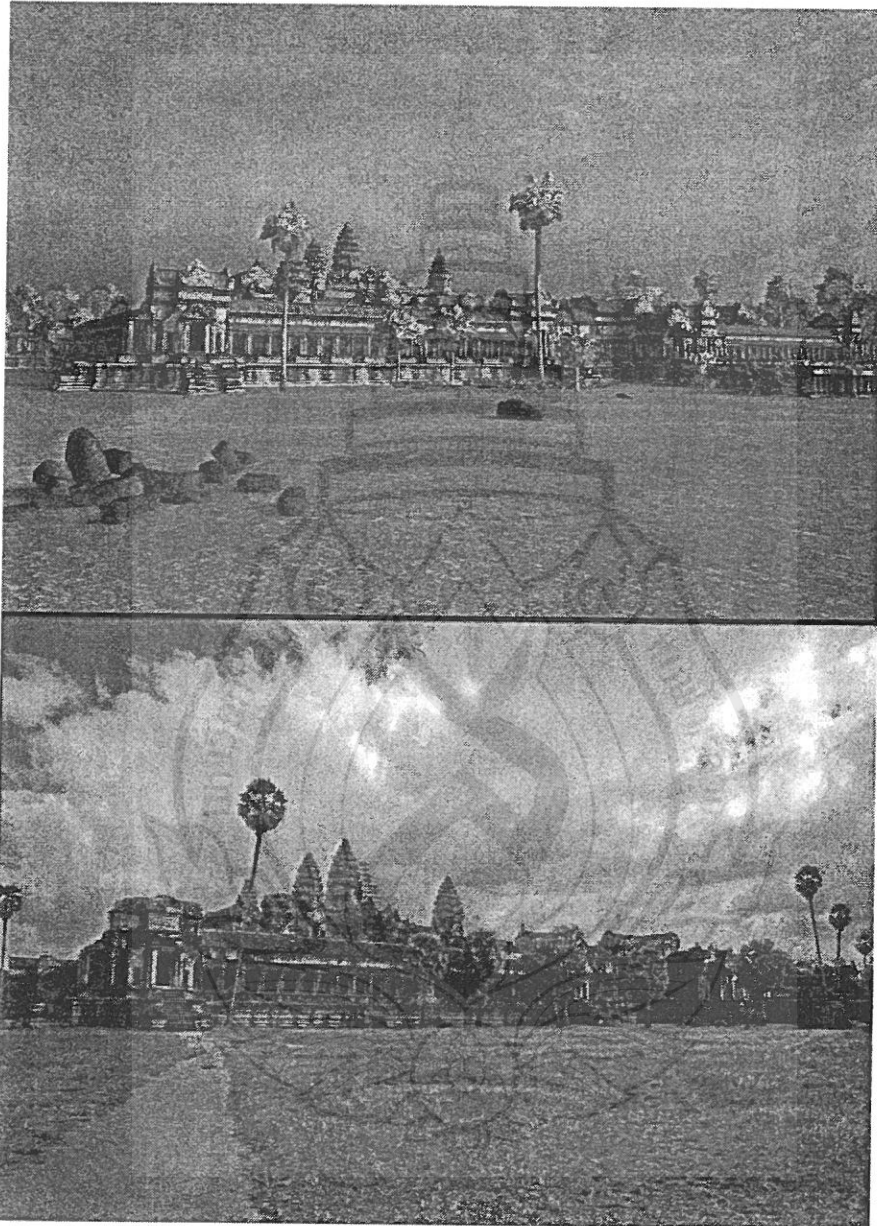
**3D Image**  
**Lanthong Vihara**  
**Mae Fah Luang University, Chiang Rai , Thailand**

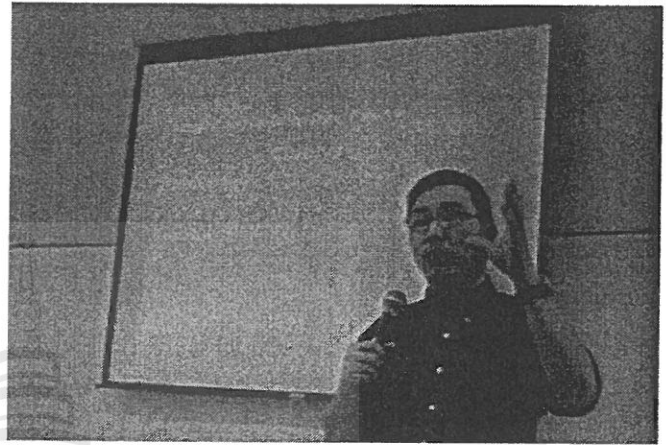
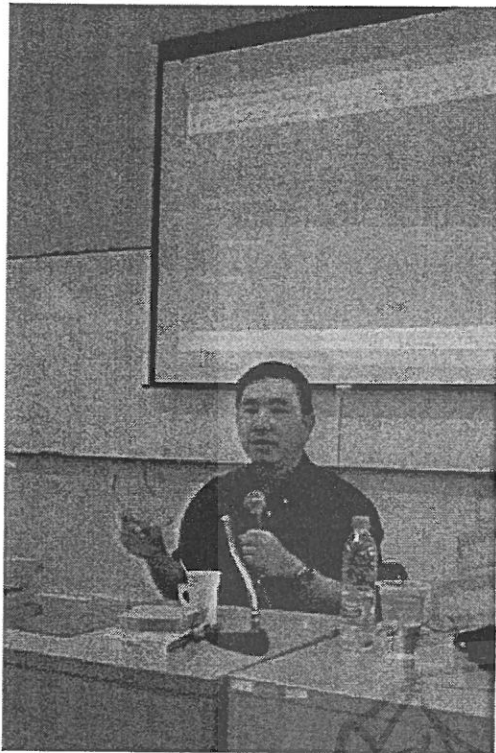


### Example 3D comparison photos at Angkor Wat

From

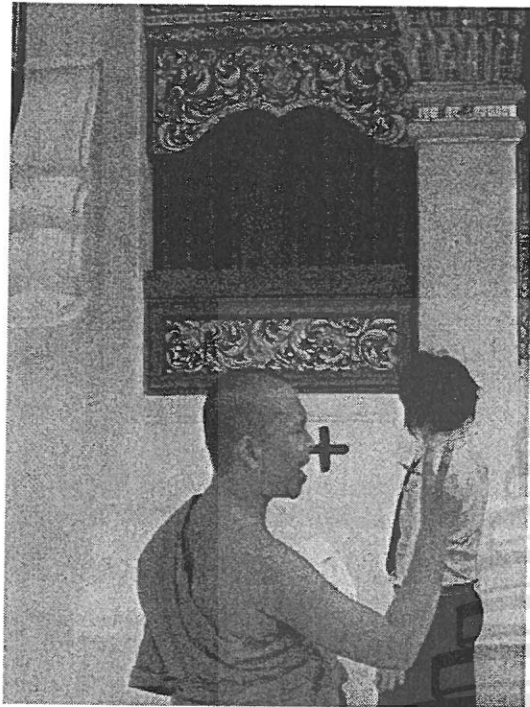
<http://www.devata.org/2009/08/virtual-or-reality-12-amazing-3d-comparison-photos-at-angkor-wat/>



**SPECIAL LECTURERS IN THIS RESEARCH**

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