

Safety Signage for Communication in Thai Elderly Accommodation

ระบบป้ายสัญลักษณ์ความปลอดภัยสำหรับสื่อสารภายในที่พักอาศัยสำหรับผู้สูงอายุไทย

Waraporn Mamee *

Nirat Soodsang **

Abstract

This research was aimed to 1) examine the safety signage for communication in Thai elderly accommodation including the signage shape, material, letters, letter color, layout, signage color, and symbol graphics, including personal information of questionnaire respondents and need in signage style; 2) design the safety signage for communication in Thai elderly accommodations including the signage shape, material, letter, letter color, layout, signage color, and symbol graphic suitable for the elderly; and 3) evaluate the perception and understanding of the safety signage among the research sample which consists of Thai academics, instructors, individuals with experiences in related fields of education communication, medicines, nursing, graphic design, signage design; and 3 groups of Thai elderly, i.e. early elderly (aged 60-69 years), middle elderly (aged 70-79 years), and late elderly (aged 80 years and over). Research instruments comprise a questionnaire on personal information of respondents, an opinion questionnaire on safety signage system for communication in Thai elderly accommodation, a questionnaire on elderly perception of the safety signage, and a questionnaire on elderly understanding of the safety signage. Research statistics include percentage (%), mean ($\bar{x}$), standard deviation (S.D.), Independent Sample (t-test), One-Way ANOVA (F-test), Nonparametric Tests (Kruskal-Wallis Test), and Nonparametric Tests (Mann-Whitney U-Test). The result on perception of safety signage revealed that the elderly with differences in sites, sexes, ages, education, and visual problems displayed differences in perception. Regarding the understanding of the safety signage, the elderly with

* นิสิตระดับปริญญาเอก สาขาวิชาศิลปะและการออกแบบ คณะสถาปัตยกรรมศาสตร์ มหาวิทยาลัยนเรศวร

Ph.D. student., Graduate student in Art and Design, Faculty of Architecture, Naresuan University.,
bedede@hotmail.com, 08-6882-2005

** รองศาสตราจารย์ ดร. ประจำสาขาวิชาออกแบบผลิตภัณฑ์และบรรจุภัณฑ์ คณะสถาปัตยกรรมศาสตร์ มหาวิทยาลัยนเรศวร

Associate Professor Dr., Program in Art and Design, Faculty of Architecture, Naresuan University.,
dmnirat@hotmail.com, 08-1483-2032

differences in shapes, sites, sexes, ages, education displayed differences in understanding, while those with differences in visual problems displayed no differences in understanding of the signage.

Keywords: 1. Signage 2. Communication 3. Accommodation 4. Thai elderly 5. Graphic Design

บทคัดย่อ

การวิจัยเรื่องนี้มีวัตถุประสงค์ 1) เพื่อวิเคราะห์ระบบป้ายสัญลักษณ์ความปลอดภัยสำหรับสื่อสารภายในที่พักอาศัยสำหรับผู้สูงอายุ 2) เพื่อออกแบบระบบป้ายสัญลักษณ์ความปลอดภัยสำหรับสื่อสารภายในที่พักอาศัยสำหรับผู้สูงอายุ 3) เพื่อประเมินการรับรู้และความเข้าใจที่มีต่อระบบป้ายสัญลักษณ์ความปลอดภัยสำหรับสื่อสารภายในที่พักอาศัยสำหรับผู้สูงอายุ จากกลุ่มตัวอย่างที่ใช้ในการวิจัย คือ นักวิชาการ อาจารย์ ผู้มีประสบการณ์เกี่ยวข้องในสาขาวิชาทางการสื่อสาร การศึกษา การแพทย์ พยาบาล ออกแบบกราฟิก ออกแบบระบบป้ายสัญลักษณ์และผู้สูงอายุวัยต้น วัยกลางและวัยปลาย เครื่องมือที่ใช้ในการวิจัย ได้แก่ แบบสอบถามเกี่ยวกับข้อมูลส่วนบุคคลของผู้ตอบแบบสอบถาม แบบสอบถามด้านความคิดเห็นที่มีต่อระบบป้ายสัญลักษณ์แบบสอบถามการรับรู้และความเข้าใจของผู้สูงอายุที่มีต่อระบบป้ายสัญลักษณ์ความปลอดภัยสำหรับสื่อสารภายในที่พักอาศัยสำหรับผู้สูงอายุ สถิติที่ใช้ในการวิจัย คือ ค่าร้อยละ หรือ % เปอร์เซ็นต์ (Percentage) ค่าเฉลี่ย ($\bar{x}$) ค่าเบี่ยงเบนมาตรฐาน (S.D.) Independent Sample (t-test), One-Way ANOVA (F-test), Nonparametric Tests (Kruskal-Wallis Test), Nonparametric Tests (Mann-Whitney U-Test) ผลการวิจัย พบว่า ผู้สูงอายุส่วนใหญ่มีความต้องการป้ายสัญลักษณ์ที่เป็นข้อความพร้อมภาพสัญลักษณ์ คิดเป็นร้อยละ 82 ผู้สูงอายุส่วนใหญ่เลือกสัญลักษณ์ตัวแทนของผู้สูงอายุเพศชาย ทรงผมแสกข้างใส่แว่นสายตาคิดเป็นร้อยละ 22 ผู้สูงอายุส่วนใหญ่เลือกสัญลักษณ์ตัวแทนของผู้สูงอายุเพศหญิงเกล้าผมมวยสูง คิดเป็นร้อยละ 25 ผู้สูงอายุส่วนใหญ่เลือกสัญลักษณ์ตัวแทนของผู้สูงอายุทั้งหมดที่เห็นว่ามีความเหมาะสมที่จะนำไปพัฒนาจัดทำเป็นระบบป้ายสัญลักษณ์แบบมีส่วนของสีที่บ่งบอกและลายเส้น คิดเป็นร้อยละ 65 ความคิดเห็นที่มีต่อรูปร่างของป้ายที่เหมาะสมสำหรับผู้สูงอายุ รูปแบบสี่เหลี่ยมผืนผ้า มีค่าเฉลี่ยสูงสุดรวม ($\bar{x} = 4.26$, S.D. = 0.83) วัสดุสำหรับป้ายที่เหมาะสมสำหรับผู้สูงอายุ วัสดุสติ๊กเกอร์ มีค่าเฉลี่ยสูงสุดรวม ($\bar{x} = 4.17$, S.D. = 0.88) ความคิดเห็นที่มีต่อตัวอักษรบนป้ายที่เหมาะสมสำหรับผู้สูงอายุ ตัวอักษรไทยสารบัญ มีค่าเฉลี่ยสูงสุดรวม ($\bar{x} = 4.37$, S.D. = 0.83) สีของตัวอักษรบนป้ายที่เหมาะสมสำหรับผู้สูงอายุ สีดำบนพื้นสีขาว มีค่าเฉลี่ยสูงสุดรวม ($\bar{x} = 3.57$, S.D. = 1.11) การจัดวางบนแผ่นป้ายสัญลักษณ์ที่เหมาะสมสำหรับผู้สูงอายุ การจัดวางรูปแบบเรียงตามลำดับของการอ่านเริ่มจากข้อความภาษาไทย ภาพสัญลักษณ์และข้อความภาษาอังกฤษอยู่ในตำแหน่งกลาง มีค่าเฉลี่ยสูงสุดรวม ($\bar{x} = 4.02$, S.D. = 0.66) สีของป้ายที่เหมาะสมสำหรับผู้สูงอายุ สีเหลือง มีค่าเฉลี่ยสูงสุดรวม ($\bar{x} = 3.70$, S.D. = 1.08) ความคิดเห็นที่มีต่อภาพเครื่องหมายสัญลักษณ์ภาพที่เหมาะสมสำหรับผู้สูงอายุเปรียบเทียบชุดภาพภาพที่ถ่ายทอดตามความจริงสัญลักษณ์เต็มตัว นำลักษณะของผู้สูงอายุในการใช้ชีวิตประจำวันมาใช้ในการออกแบบ มีค่าเฉลี่ยสูงสุดรวม ($\bar{x} = 3.80$, S.D. = 0.91) ความคิดเห็นที่มีต่อภาพเครื่องหมายสัญลักษณ์ภาพที่

เหมาะสมสำหรับผู้สูงอายุ รวมทุกรายการ ภาพที่ถ่ายทอดตามความจริงสัญลักษณ์เต็มตัว นำลักษณะของผู้สูงอายุในการใช้ชีวิตประจำวันมาใช้ในการออกแบบ มีค่าเฉลี่ยสูงสุดรวม ($\bar{x} = 3.30$, S.D. = 0.16) ด้านการรับรู้ในระบบป้ายสัญลักษณ์ความปลอดภัย พบว่า รูปแบบ สถานที่ เพศ อายุ การศึกษาและปัญหาการมองเห็นต่างกันการรับรู้ต่างกันอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05 ส่วนด้านความเข้าใจในระบบป้ายสัญลักษณ์ความปลอดภัย พบว่ารูปแบบ สถานที่ เพศ อายุ การศึกษาต่างกันความเข้าใจต่างกัน ในขณะที่ปัญหาการมองเห็นของผู้สูงอายุต่างกันความเข้าใจในระบบป้ายสัญลักษณ์ไม่แตกต่างกัน

คำสำคัญ : ป้ายสัญลักษณ์ การสื่อสาร ที่อยู่อาศัย ผู้สูงอายุไทย การออกแบบกราฟิก

Introduction

Elderly people are those with rich experiences and knowledge to contribute to our society. The number of this population group will increase and the proportion of single elderly will also rise in the future. With decreasing number of their children, these elderly need to depend on themselves. However, as a result of health technologies and medical advancement, the elderly today live longer than in the past. (Mingsarn Kaosa-ard and Natthaporn Liamjaraskul, 2013, p 94). As Thailand is now entering the aging society with a vast increase in elderly population, it should be aware of the factors that might marginalize them especially the poverty, living alone, and suffering from illnesses. Fortunately, many good cultures remain among Thai people and we need to extract and use them as a pulling force to keep the elderly from such social marginalization (Pramote Prasartkul, 2555, p 81). The number of elderly population in Thailand was ranked second after Indonesia. Comparing by proportion, those aged over 65 were as high as 12.59%, suggesting that Thailand ranked first in ASEAN for the highest share of elderly population (Ming Mahakittikun, Creative Thailand Symposium, 2016). Thailand has paced toward the aging society since 2005 and will become an aged society by the year 2030, and the number of elderly population is expected to grow. This has led to the formulation of the Second National Plan for Older Persons (2002-2021) with its Strategy 2 focusing on elderly health promotion. This strategy contains 6 key measures including promoting the knowledge on basic health promotion, self-prevention and care; promoting co-existence and strengthening the organizations for older people; promoting jobs and income earning of the elderly; supporting the elderly who have acquired competencies; promoting and supporting the inclusion of programs for elderly in all types of media to ensure their exposure to knowledge and access of information and media; promoting and supporting the elderly with safe and appropriate residence and environment. Based on the last sixth

measure, the elderly are entitled to receive public welfare and facilities as well as suitable assistance from the government. Concerned organizations are required to establish minimum standards of residences and environment for the elderly. This is in line with the 12th National Economic and Social Development Plan (2017-2021) in its strategy on elderly health promotion. At the end of the 11th National Economic and Social Development Plan in 2016, the subsequent 12th Plan (2017-2021) was adhered to the 20-Year National Strategy (2017-2036) to provide the elderly promotion strategy. In addition, the office of the National Research Council of Thailand aimed at responding the need for national development in 9 urgent matters, among which is social development for older persons. Accordingly, this is the author's focus of interest in terms of promoting the elderly to have appropriate and safe residence and environment for their daily living (Poramethee Wimolsiri, 2016, pp.3-50). As people reach old age, they will experience physical changes. Health problem is most common during this old age, followed by economic and poverty problems. The elderly who prepare themselves earlier will be able to better handle these problems than those without any preparation. Management of suitable and safe environment is a way to prepare their residence and surroundings to suit their physical condition and changing health which include such as deteriorated vision, hearing, and bones (Manop Tansuphayon, 2012). Previous environment unsuitable for physical changes with increasing age might lead to accidents and eventually disabilities. Residential and environmental adjustment will facilitate those elderly when living alone. Good physical environment also helps reduce accidents and dependency. Management of physical environment and facilities are vital to the living of the elderly as it makes their life easier especially for those who stay on their own. (Tirat Jarutach, et.al., 2005, pp.1-2).

Graphic works are in various types. The one of the author's interest for the current study is called Environmental Graphic Design (EGD). EGD functions in guiding ways (Signage Wayfinding System) allowing for perceiving direction and identifying one's direction in various environments. EGD is used to communicate (Interpretation) to audiences about the place precisely and easy to understand. It creates the identity of the place (Placemaking), builds stories and distinction to the environment. Graphic design is part of physical environment of living places. Graphics highly influence our daily life. Seeing and perceiving pictures of things through the eyes are more persuasive than other forms of perception. Good graphic work relies on good design. Design solution that brings illustration, photography, symbol, and typography into the layout to clearly present messages will benefit communication process and directly represent the value of design. Graphic work employs the combination of art

technique and design principles to create a variety of forms with highest potential as media to communicate the message between the sender and receiver. The value of graphic work is to mediate for common understanding and act as media for the learning to occur. It draws interest, stimulates idea and decision making, as well as creativity, and can lead watchers to behavioral changes in both action and thought (Nongkran Khumwichai, 2014, pp. 10-12).

Accordingly, the author's interest is to examine the safety signage for communication in Thai elderly accommodation as the author realized the importance of elderly for their life experience and knowledge that can contribute to the society, and they are also valued and respected by offspring. In addition, Thailand will become the aged society in the near future during which preparation is needed for the well-being of the elderly who will have to experience both physical and psychological changes. The current study to examine the safety signage for communication in Thai elderly accommodation was inspired by the fact that the common health problems in the old age are the decline in perception and vision. Previous environmental condition seemed not to fit those changes with increasing age that might possibly lead to accident and disabilities which can be prevented or reduced by proper adjustment of physical environment. This will also reduce the elderly dependency and make their living easier especially among those who live on their own. Safety signage for communication in Thai elderly accommodation will significantly facilitate the elderly daily living particularly for those with impaired perception and vision. Good safety signage provides clear message to better communicate for common understanding. It functions as media for the learning to occur, stimulates cognition and decision making, resulting in the elderly's change of behavior in both action and thought. The signage design must contain messages intended to present in the form easier understandable by the elderly without taking much time and difficulty, and applies to either of those with literacy or reading impairment. Safety signage will partly facilitate safe living as it is vital to those in their later years of life.

Materials and Methods

The author employed a research methodology in the following stages according to the research objectives.

Stage 1 Analysis of safety signage for communication in Thai elderly accommodations, comprising 2 parts

1) Analysis of safety signage for communication in Thai elderly accommodation from relevant documents and research works

From the analysis of relevant documents and research works, the author drew conclusions on the criteria used in those research related to safety signage for communication in Thai elderly accommodation. The criteria includes different elements of 1) signage design principles, 2) symbol design principles, 3) letter design principles, 4) letter and symbol color use principles, 5) legible letter colors, 6) prominent symbol colors, and 7) graphic design principles.

2) Analysis of safety signage for communication in Thai elderly accommodations from the questionnaire on personal information of respondents and need in safety signage style

1. Population and sample

The population includes Thai male and female elderly who possess full consciousness, sound mind, and are literate.

The sample comprises 100 male and female elderly including early elderly (aged 60-69 years), middle elderly (aged 70-79 years), and late elderly (aged 80 years and over) who possess full consciousness, sound mind, and are literate.

2. Research variables

Dependent variables consist of personal factors, i.e. sex, age, education status, position/occupation, personal illness, visual problem, domestic accident, and cause and location of accident.

Independent variable is the need in safety signage style for home residence.

3. Instruments and instrument development

The questionnaire on personal information of Thai elderly respondents and the need in safety signage style provide basic personal information about respondents regarding their background, experience, and various problems that caused difficulties in living their daily life. The questionnaire took an open ended form and a closed ended form and contains altogether 10 items.

4. Data collection

The data collected involves basic personal information of respondents involving their background, experience, and problems that caused difficulties in living their daily life.

1) One hundred elderly respondents in shared and single accommodations in Bangkok, Samutprakarn, and Phitsanulok.

2) The author followed up to collect the data and 100 completed questionnaires were returned accounting for 100%.

The author gather the data from these structured questionnaires for further analysis, then proceeded to designing safety signage for communication in Thai elderly accommodation.

5. Data analysis methods

The author chose the types of statistical analysis that are relevant to the nature of data and answer the research objectives as follows.

The general information of respondents including sex, age, personal illness, visual problem, domestic accident, cause and location of accident was analyzed for frequency distribution and percentage.

Stage 2 Designing safety signage for communication in Thai elderly accommodation

1. Population and sample

The population includes technical experts and individuals with experiences about graphic design or related fields who will evaluate the design of safety signage for communication in Thai elderly accommodation.

The sample comprises 10 technical experts and individuals with experiences about graphic design or related fields who will evaluate the design of safety signage for communication in Thai elderly accommodation.

2. Research variables

Dependent variable is the safety signage for communication in Thai elderly accommodation.

Independent variable is the opinion on the design of safety signage for communication in Thai elderly accommodation.

3. Instruments and instrument development

The opinion questionnaire on safety signage for communication in Thai elderly accommodation used by the author is a 5-point rating scale, structured questionnaire.

4. Data collection

After the experts finished their rating of self-opinion on the design of safety signage, the author added the total scores of the 10 experts and computed for statistical mean in order to find the most suitable components of signage for the elderly, and accordingly design the safety signage for communication in Thai elderly accommodations

5. Data analysis methods

The author analyzed the questionnaire data from the evaluation by experts, drew conclusions and presented in mean ($\bar{x}$) and standard deviation (S.D.).

Stage 3 Evaluation on the perception and understanding of safety signage for communication in Thai elderly accommodation

1. Population and sample

The population includes male and female elderly who possess full consciousness, sound mind, and are literate.

The sample comprises 50 male and female elderly in 3 groups of early elderly (aged 60-69 years), middle elderly (aged 70-79 years), and late elderly (aged 80 years and over) who possess full consciousness, sound mind, literacy, self-care ability, participation in social activities domestically and externally. They must be the elderly with the ability of walking and self-help as ADL1 (Active aging) and the elderly with the ability to stand or walk with help or inability to move freely as ADL2 (Needs a little help).

2. Research variables

Dependent variable is the safety signage for communication in Thai elderly accommodations.

Independent variables are the elderly perception of the safety signage for communication in Thai elderly accommodation, and the elderly understanding of the safety signage.

3. Instrument and instrument development

The instruments are in 2 parts.

1) A questionnaire on elderly perception of the safety signage for communication in Thai elderly accommodation. The scoring criteria for this questionnaire is based on the elderly's matching of the meaning against corresponding symbol, with correct answer receiving 1 score and false answer receiving no score. For the scoring criteria on perception, 1 score refers to having perception (knowing) and 0 score refers to no perception (unknowing)

2) A questionnaire on elderly understanding of the safety signage for communication in Thai elderly accommodation. The scoring criteria for this structured questionnaire is based on the level of understanding as indicated on a 5-point rating scale.

4. Data collection

1) The author met with the sample of elderly at Wangthong Home for Destitute, Phitsanulok Province, Sawangkanives Retirement Home, Samutprakan Province, and private residences of the elderly in Bangkok and Phitsanulok Province. The author selected a sample of 50 respondents using purposive sampling by determining informants based on the research objectives. They were explained about the objectives of this questionnaire administration and are asked to cooperate in data collection. The questionnaires were set to be collected back from each site within 7 days.

2) At due date, the author followed-up to collect the data, with a return of 50 completed questionnaires accounting for 100%.

5. Data analysis methods

The author brought the data obtained from the questionnaires to the analysis and computation of mean ($\bar{x}$). The criteria for interpreting the elderly's understanding are based on the elderly's scores on the questionnaire, with the scores of 80% and over suggesting a good level of understanding. The following analyses were employed.

1) A comparative analysis involves 1.1) different graphic designs, 1.2) different sexes, 1.3) different visual problems, using an Independent Sample (t-test).

2) One-Way ANOVA for mean comparison among 2 sample groups or more involves 2.1) different places, 2.2) different ages, and 2.3) different education, using analytical statistics of percentage (%), mean ($\bar{x}$), standard deviation (S.D.), One-Way ANOVA (F-test), Nonparametric Tests (Kruskal-Wallis Test), and Nonparametric Tests (Mann-Whitney U-Test).

3) A pair comparison analysis between graphic designs, sites, sexes, ages, education, and visual problems for the opinion on safety signage for communication in Thai elderly accommodations.

Results

1. Summary analysis result on safety signage for communication in Thai elderly accommodation

1.1 Summary analysis result on safety signage for communication in Thai elderly accommodations from relevant documents and research works. The author provides a concluding criteria used in the current study as follows.

1.1.1 Signage design principles The standard criteria were chosen for evaluating the signage design principles, ranked highest in 8 components: 1) legible message, 2) widely understandable language, 3) perceivable and understandable symbol, 4) large letter size readable from a standard distance, 5) simple form of letters for universal reading, 6) language, culture, and social status of users, 7) stand out from surroundings, and 8) process and material easy to produce and low-priced.

1.1.2 Symbol design principles The standard criteria were chosen for evaluating the symbol design principles, ranked highest in 11 components: 1) unique, 2) attractive, 3) understandable by cognitive level of the target group, 4) suitable for the target group, 5) suitable across times and periods, 6) quick communication of objectives, 7) scaling down the symbol needs to consider its function, 8) good symbol should be in one colored design, 9)

simplicity, 10) uniqueness in meaning to represent single purpose, and 11) process and material easy to produce and low-priced.

1.1.3 Letter design The standard criteria was chosen for evaluating letter design, ranked highest in 6 components: 1) legible, 2) comprehensively communicate with short and precise words, 3) letter design in 2 languages and legible style, 4) simple letter choices for best legible, 5) providing spaces suitable for reading, and 6) using words with understandable meaning by the public.

1.1.4 Letter and symbol colors use principles The standard criteria was chosen for evaluating letter and symbol colors use principles, ranked highest in 5 components: 1) signage color choices are the same for the whole set, 2) bright color choices to highlight in a brief look, 3) color choices based on realities, 4) commercial design with budget consideration when adding 1 more color, and 5) color choices suitable for consumer's age.

1.1.5 Legible letter colors The standard criteria was chosen for evaluating legible letter colors, ranked highest in 6 components 1) black letters on white background, 2) blue letters on white background, 3) red letters on white background, 4) green letters on white background, 5) brown letters on white background, and 6) purple letters on white background.

1.1.6 Prominent symbol colors The standard criteria was chosen for evaluating prominent symbol colors, ranked highest in 6 components: 1) black symbol on yellow background, 2) black symbol on white background, 3) blue symbol on white background, 4) white symbol on blue background, 5) green symbol on white background, and 6) red symbol on white background.

1.1.7 Graphic design principles The standard criteria was chosen for evaluating graphic design principles, ranked highest in 6 components: 1) aesthetics, 2) contemporariness, 3) simplicity, 4) unity, 5) balance, and 6) attraction and style.

All of these criteria derived from the structural synthesis of relevant documents of signage design were used by the author to guide in designing safety signage and designing research instruments.

1.2 Summary analysis result on safety signage for communication in Thai elderly accommodation from the questionnaire on personal information of respondents and the need in safety signage style, containing 2 parts.

1.2.1 Summary analysis result on personal information of respondents. The majority or 59 elderly respondents are female (59%), 61 (61%) aged 60-69 years, 59 (59%) were married and living together, 50 (50%) completed primary education, 32 (32%) did not work,

and 55 (55%) had personal illness such as hypertension, high blood cholesterol, diabetes, arthritis, cancer, renal disease. Most of them or 49 respondents (49%) were longsighted, and 93 (93%) had experienced domestic accident. The common causes of accidents were falls, slipping, falling down the stairs, and falling into a pit. Greater number or 32 elderly respondents (32%) experienced accident in the kitchen. The knowledge about sex, age, educational status, occupational position, personal illness, visual problem, and domestic accident allowed the author to design safety signage to meet the real need of elderly group.

1.2.2 Summary analysis result on the need in safety signage style. The majority or 82 elderly respondents (82%) reported the need in safety signage style of words with symbol, 22 (22%) chose style # 6 of male representative character, 25 (25%) chose style # 6 of female representative character, 65 (65 %) choose style # 1 of representative character of all elderly as considered suitable to develop in-door safety signage for elderly accommodation.

2. Summary result of opinion on the design of safety signage for communication in Thai elderly accommodation

Analysis result of opinion on the shape of safety signage suitable for the elderly suggests that style # 1 in rectangle shape was reported with highest total mean ($\bar{x} = 4.26$) (S.D. = 0.83) as it is suitable for safety signage. The rectangle shape is simple, beautiful, easy to produce, and low-priced.

Analysis result of opinion on the material of safety signage suitable for the elderly suggests that style # 4 of sticker was reported with highest total mean ($\bar{x} = 4.17$) (S.D. = 0.88) as it is suitable for safety signage. The material is safe, prominent, noticeable, beautiful, easy to produce, and low-priced.

Analysis result of opinion on the letters on safety signage suitable for the elderly suggests that style # 1 of TH Sarabun was reported with highest total mean ($\bar{x} = 4.37$) (S.D. = 0.83) as it is suitable for reading. The letter is legible, clear, and simple.

Analysis result of opinion on the color of letters on safety signage suitable for the elderly suggests that style # 1 with black letter on white background was reported with highest total mean ($\bar{x} = 3.57$) (S.D. = 1.11) as it is suitable for making signage. Black letter is prominent, noticeable, and suitable for consumer's age.

Analysis result of opinion on the layout on safety signage suitable for the elderly suggests that style # 4 was reported with highest total mean ($\bar{x} = 4.02$) (S.D. = 0.66) as style # 4 presents proper layout of images, and proper layout of messages. It is legible, beautiful, and has unity.

Analysis result of opinion on the color of safety signage suitable for the elderly suggests that style # 1 in yellow color was reported with highest total mean ($\bar{x} = 3.70$) (S.D. = 1.08) as yellow color is suitable for making signage. It is prominent, noticeable, suitable for consumer's age, and represents warning.

Analysis result of opinion on the symbol graphics suitable for the elderly (comparison between graphics sets) suggests that set # 1 with realistic graphics, full character, using elderly characters in daily living in the design was reported with highest total mean ($\bar{x} = 3.80$) (S.D. = 0.91) as the style is easiest to understand and fully communicate the elderly characters.

Analysis result of opinion on the inclusive sets of symbol graphics suitable for the elderly suggests that style A with realistic presentation, full character, using elderly characters in daily living in the design was reported with highest total mean ($\bar{x} = 3.30$) (S.D. = 0.16) as the style is easiest to understand and fully communicate the elderly characters.

Considering individual items, style B with graphics in distortion, half and distorted characters, using elderly characters in daily living in the design was chosen for the highest number of 10 items since this style is legible, simple, and communicate the elderly characters, as shown in Figure 1.



Figure 1 Symbolic graphics of set 1 (A) and set 2 (B)

3. Summary analysis result of evaluation on perception and understanding of safety signage for communication in Thai elderly accommodation

3.1 Summary analysis result of the questionnaire on elderly perception of safety signage for communication in Thai elderly accommodation

Analysis result on the perception of safety signage among the Thai elderly living at different sites revealed that those living at Sawangkanives, Samutprakarn reported with highest perception, accounting for 86.17%. The analysis also showed the differences in perception among the Thai elderly living at different sites.

Comparative analysis result on elderly perception of 2 different graphics styles indicated that most of the elderly or 79.47% perceived style 1 of graphics with realistic presentation, full character, and using elderly characters in daily living in the design. The comparative analysis also showed the differences in perception of different graphic styles.

Comparative analysis of the perception of elderly with different sexes found that female elderly reported highest in perception, accounting for 78.03%. The comparative analysis also showed that the elderly with different sexes displayed differences in perception.

Comparative analysis result on the perception of elderly with different ages found that the perception was highest among the middle elderly aged 70-79 years, accounting for 78.03%. The comparative analysis also showed that the elderly with different sexes displayed differences in perception.

Comparative analysis result on the perception of elderly with different level of education indicated that the perception was highest among the Thai elderly with lower secondary education, accounting for 91.17%. The comparative analysis also showed that the elderly with different level of education displayed differences in perception.

Comparative analysis result on the perception of elderly with different visual problems found that most of the elderly or 77.90% reported having visual problems. The comparative analysis also showed that the elderly with differences in visual problems displayed differences in perception.

3.2 Analysis result of the questionnaire on the elderly understanding of safety signage for communication in Thai elderly accommodation

Comparative analysis result on the elderly understanding of safety signage for communication in Thai elderly accommodation among the Thai elderly living at different sites suggested that the understanding was highest among the Thai elderly living at Wangthong

Home for Destitute with total mean ($\bar{x} = 4.59$) (S.D. = 0.50). The analysis result also showed that the elderly living at different sites displayed differences in understanding.

Comparative analysis result on the elderly understanding of 2 different graphics styles suggested that most of the elderly reported their understanding of the graphics style 1 with realistic presentation, full character, using elderly characters in daily living in the design with total mean ($\bar{x} = 4.59$) (S.D. = 0.60). The analysis result also showed differences in understanding of different graphic styles.

Comparative analysis result on the understanding of elderly with different sexes found that male elderly reported highest in understanding with total mean ($\bar{x} = 4.72$) (S.D. = 0.47). The analysis result also showed that the elderly with different sexes demonstrated differences in understanding.

Comparative analysis result on the understanding of elderly with different ages found that the late elderly aged 80 years and over reported highest in understanding with total mean ($\bar{x} = 4.83$) (S.D. = 0.21). The analysis result also showed that the elderly with different ages demonstrated differences in understanding.

Comparative analysis result on the understanding of elderly with different level of education suggested that the elderly with higher than a bachelor degree reported highest in understanding with total mean ($\bar{x} = 4.83$) (S.D. = 0.17). The analysis result also showed that the elderly with different level of education demonstrated differences in understanding.

Comparative analysis result on the understanding of elderly with different visual problems found that those elderly with and without visual problems displayed no differences in understanding.





Figure 2 Symbol graphics for asking about the understanding of elderly

Discussion/Conclusion

The present research provides recommendations for further research to investigate among other elderly groups with different physical impairments so as to facilitate every group of signage users. With respect to data collection, this research had its limitation in terms of duration. To obtain better quality and reliability of data, it is suggested to increase the population for inquiry. The knowledge gained in this study offers a guideline and criteria for designing the shape, material, letters, letter color, symbol graphics, layout, signage color, and the style of signage in overall which is applicable to designing signage for the elderly in other places.

The results of the perception and understanding that the elderly have realized and understood the graphics as the truth (realistic). The full adult symbol graphics brings the symbol of the elderly in the daily life of the design with the highest average, so it is important to develop a Thai elderly symbol graphics for a variety of everyday life and in the world's changing, including modifying the query form that encourages the elderly to comment on finding satisfaction in the symbol graphics, including perception and understanding of the image. The safety signage system for the elderly in the Thai residents in other ways, as well as to learn about the system installation of signs of symbol graphics that affects the elderly of Thailand.

References

- Duangrat Danthainum. (2007). "Environmental Graphic Design for Environment in Bangkok Area". **Research Article**. Bangkok: Suan Sunandha Rajabhat University.
- Jumpol Sangkagate, Somsak Jeewattana, and Nalinthip Pimklat. (2017). "Development of guidelines of informal education for the police lancecorporal students of police training centers." *Veridian E-Journal, Silpakorn University* 10, 1 (January - April): 1730-1745.
- Manop Tansuphayon. (2012). "Handbook for Technicians and Members of Community for Management of Environment Suitable for the Elderly: Morbaan". Bangkok: Bureau of Promotion and Protection of the Elderly, Office of Promotion and Protection of Children, Youth, the Elderly, and the Disabled, Ministry of Social Development and Human Security.
- Ming Mahakittikun. (2016). "Creative Aging: The New Opportunity". Bangkok: Creative Thailand 2016 Seminar. Integration of Government and Private Sectors.
- Mingsarn Kaosa-ard and Natthaporn Liamjaraskul. (2013). "The Life of Thai People in the Two Decades of Development". Bangkok: Good Public Policy Promotion Plan.
- Nongkran Khumwichai. (2014). "Computer Graphic Design (Graphics Basic)". Retrieved on 29 November 2014, from <http://www.slideshare.net/nongluk/1-graphics-basic-new>
- Poramethee Wimolsiri, (2016). "20-Year National Strategy: Future Thailand". Bangkok: National Economic and Social Development Board.
- Pramote Prasartkul. (2012). "Thai Society Remains at Primary Level". Bangkok: Population and Development Newsletter: 32 (6) Institute for Population and Social Research, Mahidol University.
- Trirat Jarutach. (2009). "Universal Design Code of Practice". Bangkok: The Association of Siamese Architects under the Royal Patronage of His Majesty the King.
- Trirat Jarutach, et.al. (2005). "Minimum Standard of Housing and Environment for the Elderly". Final Research Report. Bangkok: Thailand Research Fund.
- Thira Veerakul. (2002). "Signage System Design for Thai Children by Using "The Relation of Ideas" Theory". Thesis, Master of Fine and Applied Art. Bangkok: Chulalongkorn University.
- Wasinghon, C. (2016). "Theory, Analysis and Design Development of The Spatial Character: A Case Study of Galyani Vadhana District, ChiangMai". *Veridian E-journal, Silpakorn University* 9, 5 (July - December): 300.