Impact of Banner Ad Position, Congruence of Banner Ad Content and Website Content, and Advertising Objective on Banner Ad Fixation, Brand Awareness, and Product Knowledge

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Abstract—*The purpose of this research is to study impact of banner ad position, top and bottom, on (1) banner ad fixation, (2) brand awareness, and (3) product knowledge. This research also investigates two moderator variables, which are (1) congruence of banner ad content and website content and (2) advertising objectives, to inform and to persuade. A series of laboratory experiments are conducted with eight websites (2 banner ad positions x 2 conditions of congruence between banner and web contents x 2 banner objectives), 10 participants for each website. An eye-tracking tool, Mirametrix S2 Eye Tracker, is used to collect banner ad fixation data. Brand awareness and product knowledge data was collected with questionnaires. The results indicate that banner ad position do not have a significant impact on banner ad fixation, brand awareness, and product knowledge. Also, the two moderator variables, (1) congruence of banner ad content and website content and (2) advertising objective do not lead to have significant impact on banner ad fixation, brand awareness, and product knowledge.*

Keywords—*Banner Ad Position; Congruence; Advertising Objective; Banner Ad Fixation; Brand Awareness; Product Knowledge*

I. INTRODUCTION

Using the Internet becomes a common activity in recent years. Because of this reason, businesses focus deeply on the Internet related media in order to reach their expected target group or their potential customers. According to the Interactive Advertising Bureau (IAB), the 2014 full year Internet advertising revenue was $49.45 billion, 16% increase from the $42.78 billion reported in 2013 [6].

Internet advertising has become a pervasive trend in business society. Banner ad is one of widely used Internet advertising tools in marketing communication. Yet, to use banner ad in webpage effectively, position of banner ad is considered as one of the major factors because the lower position of banner ad helps Internet users recognize banner ad better than upper position [4]. Moreover, another two factors which influence the banner ad recognition are congruence of banner ad content and webpage content [3, 10], and advertising objectives [8].

Those three factors mentioned above persuade users to respond to marketing objectives in two stages. When the visitors look at the banner ad and when they recognize the banner ad respectively. Thus, in this study, the banner ad recognition is separated into two parts; "brand recognition" and "product recognition", which are called "brand awareness" and "product knowledge" respectively.

In summary, in this paper, we study impact of banner ad position, congruence of banner ad content and website content, and advertising objective on banner fixation, brand awareness, and product knowledge. It is known that an eye tracking device can collect fixation data more accurately and more thoroughly than using questionnaire. Thus, Mirametrix S2 Eye Tracker was used to collect banner ad fixation in this research. For brand awareness and product knowledge, the data was collected using questionnaire.

II. RESEARCH OBJECTIVES

This study has three objectives as follow:
1) To study impact of banner ad position on banner ad fixation, brand awareness and product knowledge.
2) To study impact of banner ad position on banner ad fixation, brand awareness and product knowledge when banner ad content and website content are congruent or incongruent.
3) To study impact of banner ad position on banner ad fixation, brand awareness and product knowledge when advertising objectives are to inform or to persuade.

III. RESEARCH METHODOLOGY

A. Tools

There are four research tools employed in this research as follow:

1) Banner ad
To study impact of banner ad position, we decided to use static banner. Static banner has less influence on user's attention than other types of banner which are animated and

interactive banners. So, by using static banner we can ensure that user's attention is mostly from position of the banner ad itself. In this study, there are four formats of banners are used. Each format is a combination of two factors: (1) congruence of banner ad content and website content, and (2) advertising objective. The four formats of banners are shown in Table I.

TABLE I. BANNER AD FORMATS

Banner ad	Congruence	Advertising objective
1	Congruent (Brownie)	To inform
2		To persuade
3	Incongruent (T-shirt)	To inform
4		To persuade

A restaurant review website was chosen as the experimental website. To select banner ad content used in this study, we surveyed 166 people about congruence of 10 products that maybe advertised on a restaurant review website. The survey result indicated that 72.29% of the samples agree that product "brownie" is congruent with a restaurant review website, and 87.35% think that product "t-shirt" is incongruent with a restaurant review website. So, the two products, "brownie" and "t-shirt", were selected to put on each banner ad as congruent and incongruent banner ad content with the restaurant review website content, respectively. For the advertising objective, banner ads with the objective to persuade have information about promotion. On the other hand, banner ads with the objective to inform do not have promotion details.

2) Webpage

In the restaurant review website is used in our study, the webpage consists of two main areas, the review area and the banner ad area, as shown in Fig. 1. The banner ad is designed to appear in two different areas, top and bottom of the page. With two banner ad position (top and bottom) and four formats of banner ads, as explained in the previous section, there were eight different webpages used in the study. Fig. 2 and Fig. 3 are examples of webpages, which different positions and different products
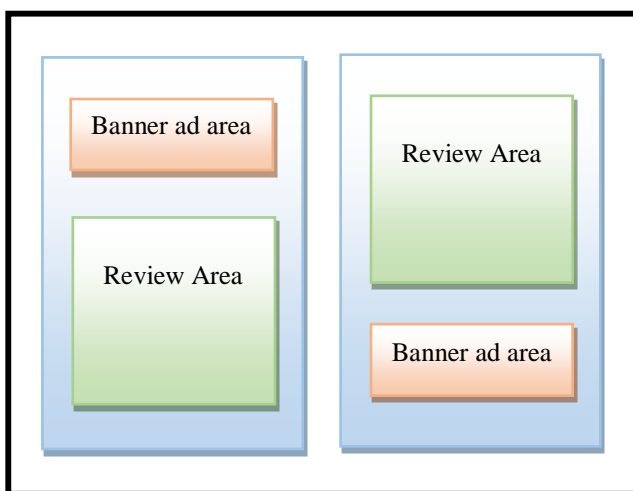

Fig. 1 Two webpage layouts

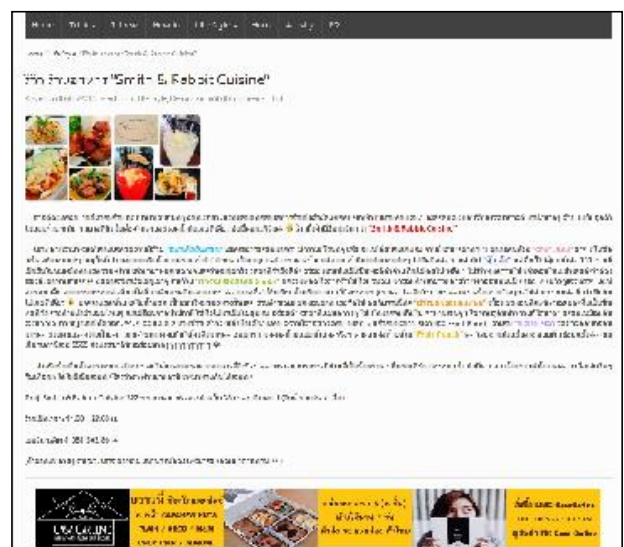Fig. 2 "T-shirt" banner ad at the top of webpage

Fig. 3 "Brownie" banner ad at the bottom of webpage

3) Eye Tracker

Mirametrix S2 Eye Tracker, shown in Fig. 4, is the eye tracking device used in this study. Mirametrix S2 Eye Tracker has a hardware part which tracks participants' eye movements and collects eye-gaze data. This hardware device works with the software "Eye tracking viewer". The software saves eye-gaze data as a CSV document as shown in Fig. 5, which will be analyzed for banner ad fixation in the study [9].

Fig. 4   Mirametrix S2 Eye Tracker

Fig. 5   CSV document generated by "Eye tracking viewer"

4) Questionnaires

There are two questionnaires used in this study. The first questionnaire asks about review of restaurant in the website. To create realistic usage of a restaurant review website, participants were asked to visit the website with some purposes, for example, to find more information about a restaurant from restaurant reviews in our experiment website. After visiting the website, participants filled in the first questionnaire which consists of (1) restaurant name, (2) location, (3) opening hours, (4) menu, (5) reviewer's name, (6) interest in the restaurant, (7) interest in general restaurant reviews. The second questionnaire collects data as follow:

- Banner ad details, which consist of (1) banner ad visibility, to check if the participant sees the banner ad or not, (2) brand awareness, to collect detailed data about the product brand on banner ad, (3) product knowledge, to measure participant's remembrance about the product on banner ad.

- Demographic data such as gender, age, education, handedness, visual impairment, Internet usage experience, Internet usage per day, and interests in banner ad.

B. Procedure

The empirical study was conducted in the following steps:

1) Participants was informed about research background and objectives. Volunteer participant wrote down date and time they wished to participate in the experiment.

2) Each participant came to his/her appointment which was arranged individually.

3) Data collection are explained to the participant. To create a realistic situation of using a restaurant review website, the participant was instructed to assume that he/she was looking at the review webpage to set the restaurant information.

4) Researcher adjusted the Mirametrix S2 Eye Tracker for each participant and started the calibration process.

5) Researcher started recording eye-gaze data when the webpage of the restaurant reviews was shown to the participant.

6) When the participant finished with the webpage, he/she had to close the page immediately, and researcher stopped recording his/her eye-gaze.

7) Participant filled in the first questionnaire about the restaurant review, and the second questionnaire about banner ad details, and demographic data.

C. Measurements

Visibility of banner ad is measured using "banner ad fixation". Banner ad fixation is calculated from eye-gaze data collected by the eye-tracking device, using number of coordinates each participant looks in the banner ad area divided by total coordinates in the banner ad area. This proportion is then converted to percentage. Brand awareness and product knowledge are measured using the correct answers each participant gives in the questionnaires. There are 5 questions for brand awareness and 8 questions for product knowledge.

Some data was discarded especially in the case where participants indicated in the questionnaire that they did not see the banner ad on the webpage, even the data collected from the eye tracker showed that the participants did look at it.

D. Participants

80 undergraduate and graduate students from Chulalongkorn Business School, Chulalongkorn University, Thailand participated in the study. A summary of demographic information of these 80 participants is shown in Table II. The participants were 70.00% female. 92.50% were 18 to 25 years old and were undergraduate students. 93.75% were right-handed. 30.00% have normal eyesight. 62.50% have more than 7 years of Internet usage experience. 43.75% use the Internet less than 3 hours per day (not including e-mail and mobile application usage). 60.00% are interested in banner ad.

TABLE II.   RESPONDENTS' DEMOGRAPHIC INFORMATION

Demographics	Distribution
Gender	30.00% male 70.00% female
Age	92.50% 18-25 years old 7.50% 26-30 years old
Education	92.50% undergraduate 7.50% graduate
Handedness	3.75% left 93.75% right 2.50% both

Demographics	Distribution
Eyesight	30.00% normal 63.75% near-sighted 2.50% far-sighted 26.25% astigmatism
Internet usage experience	2.50% Less than 3 years 2.50% 3-5 years 32.50% 5-7 years 62.50% More than 7 years
Internet usage per day	43.75% Less than 3 hours 42.50% 3-5 hours 8.75% 5-7 hours 5.00% More than 7 hours
Interest in banner ad	60.00% Interested 40.00% Disinterested

IV. RELIABILITY

1) This research used the real website, which in average is visited by 200 visitors per day, so that the participant can experience the real during the experiment.
2) The restaurant referred in the research is physically existed. Also, the participant received the information of real product from the banner ad. As a result, the participant would not feel that he/she received the made up information.
3) The static banner was used in this research to examine only the impact of the position because other types of banner, such as animated banner, may draw attention of the participants due to factors other than position.
4) The banner ad of the two products was divided into 6 parts, as shown in Fig. 6:

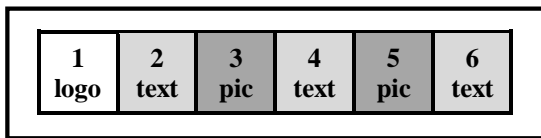| 1 logo	2 text	3 pic	4 text	5 pic	6 text

Fig. 6   Banner ad layout

- The first part is the logo of the product.
- The second, the fourth and the sixth part is the information about the product.
- The third and the fifth part is the product pictures.

The banner of the two products were in the same patterns, but different in logos, information and product pictures. Also, other detail which include font, color and size of the two banners are identical.

V. RESULTS

The results of this study are presented in three sections, each section for each research objective. The results of each section are shown in table format with mean values, standard deviation (SD) in one table, and the results of the Mann-Whitney U test for differences of banner ad fixation, brand awareness, and product knowledge are shown in a separated table.

A. Result 1: Impact of banner ad position on banner ad fixation, brand awareness and product knowledge

From Table III, we found that mean value of banner ad fixation at the top position is slightly higher than the one at the bottom position. On the other hand, mean values of brand awareness and product knowledge of banner at the bottom position are higher than the ones at the top position. However, the differences of mean values of banner ad fixation, brand awareness and product knowledge are not much for both banner ad positions.

TABLE III.   MEAN AND SD OF BANNER AD FIXATION, BRAND AWARENESS, AND PRODUCT KNOWLEDGE WHEN BANNER AD POSITIONS ARE DIFFERENT

Banner Ad Position		Mean	SD
Top	Banner Ad Fixation	0.130	0.172
	Brand Awareness	1.800	1.091
	Product Knowledge	3.180	1.318
	N = 40		
Bottom	Banner Ad Fixation	0.126	0.141
	Brand Awareness	2.050	1.108
	Product Knowledge	3.380	1.764
	N = 40		

Mann-Whitney U test results, at 95% confidence interval, as shown in Table IV indicate that there are no significantly differences of mean values of banner ad fixation, brand awareness, and product knowledge for two banner ad positions, top or bottom of the webpage.

TABLE IV.   MANN-WHITNEY U TEST OF MEAN VALUES OF BANNER AD FIXATION, BRAND AWARENESS, AND PRODUCT KNOWLEDGE WHEN BANNER AD POSITIONS ARE AT TOP AND BOTTOM OF WEBPAGE

	Banner Ad Fixation	Brand Awareness	Product Knowledge
Mann-Whitney U	738.000	707.500	773.000
Z	-0.597	-0.924	-0.266
Asymp. Sig. (2-tailed)	0.551	0.355	0.791

B. Result 2: Impact of banner ad position on banner ad fixation, brand awareness and product knowledge when banner ad content and website content are congruent or incongruent.

From Table V, when we investigated congruence of the banner ad content and the website content, we found that the mean values of banner ad fixation, brand awareness and product knowledge mostly tend to be like the ones form the

Table III. However, the mean value of product knowledge at the top position is higher than the one at the bottom position when the banner ad content is incongruent with the webpage content.

TABLE V. MEAN AND SD OF BANNER AD FIXATION, BRAND AWARENESS, AND PRODUCT KNOWLEDGE WHEN BANNER AD POSITIONS AND CONGRUENCE CONDITIONS ARE DIFFERENT

Banner Ad Position & Congruence Condition		Mean	SD
Top & Congruence	Banner Ad Fixation	0.108	0.119
	Brand Awareness	1.700	0.923
	Product Knowledge	2.850	1.309
	N = 20		
Bottom & Congruence	Banner Ad Fixation	0.104	0.083
	Brand Awareness	2.100	1.071
	Product Knowledge	3.600	1.847
	N = 20		
Top & Incongruence	Banner Ad Fixation	0.153	0.215
	Brand Awareness	1.900	1.252
	Product Knowledge	3.500	1.277
	N = 20		
Bottom & Incongruence	Banner Ad Fixation	0.149	0.181
	Brand Awareness	2.000	1.170
	Product Knowledge	3.150	1.694
	N = 20		

Mann-Whitney U test results, at 95% confidence interval, as shown in Table VI indicate that there are no significantly differences of mean values of banner ad fixation, brand awareness, and product knowledge when banner ad contents are congruent and incongruent with the webpage content.

TABLE VI. MANN-WHITNEY U TEST OF MEAN VALUES OF BANNER AD FIXATION, BRAND AWARENESS, AND PRODUCT KNOWLEDGE WHEN BANNER AD CONTENTS ARE CONGRUENT AND INCONGRUENT WITH THE WEBPAGE CONTENT

Congruence Conditions		Banner Ad Fixation	Brand Awareness	Product Knowledge
Congruence	Mann-Whitney U	166.000	160.000	158.000
	Z	-0.920	-1.131	-1.156
	Asymp. Sig. (2-tailed)	0.358	0.258	0.248
Incongruence	Mann-Whitney U	191.000	193.500	170.500
	Z	-0.243	-0.182	-0.823
	Asymp. Sig. (2-tailed)	0.808	0.856	0.411

C. Result 3: Impact of banner ad position on banner ad fixation, brand awareness and product knowledge when advertising objectives are to inform or to persuade.

From Table VII, when we investigated advertising objective, we found that mean value of banner ad fixation at the bottom of webpage is higher than the one at the top position, for informational advertising. Also, mean value of product knowledge at the top of webpage is higher than the one at the bottom position, for informational advertising. These two results are contrast with the results from Table III where we consider only banner position.

TABLE VII. MEAN AND SD OF BANNER AD FIXATION, BRAND AWARENESS, AND PRODUCT KNOWLEDGE WHEN BANNER AD POSITION AND ADVERTISING OBJECTIVE ARE DIFFERENT

Banner Ad Position & Ad Objective		Mean	SD
Top & To Inform	Banner Ad Fixation	0.084	0.098
	Brand Awareness	1.750	1.118
	Product Knowledge	3.200	1.056
	N = 20		
Bottom & To Inform	Banner Ad Fixation	0.133	0.141
	Brand Awareness	2.050	1.146
	Product Knowledge	3.000	1.376
	N = 20		
Top & To Persuade	Banner Ad Fixation	0.177	0.217
	Brand Awareness	1.850	1.089
	Product Knowledge	3.150	1.565
	N = 20		
Bottom & To Persuade	Banner Ad Fixation	0.120	0.144
	Brand Awareness	2.050	1.099

Banner Ad Position & Ad Objective	Mean	SD
Product Knowledge N = 20	3.750	2.049

Mann-Whitney U test results, at 95% confidence interval, as shown in Table VIII indicate that there are no significantly differences of mean values of banner ad fixation, brand awareness, and product knowledge when the objectives of banner are to inform and to persuade.

TABLE VIII. MANN-WHITNEY U TEST OF BANNER AD FIXATION, BRAND AWARENESS, AND PRODUCT KNOWLEDGE WHEN THE OBJECTIVES OF BANNER ARE TO INFORM AND TO PERSUADE

Advertising Objective		Banner Ad Fixation	Brand Awareness	Product Knowledge
To Inform	Mann-Whitney U	136.000	170.500	182.000
	Z	-1.731	-0.826	-0.506
	Asymp. Sig. (2-tailed)	0.083	0.409	0.613
To Persuade	Mann-Whitney U	168.500	183.500	172.500
	Z	-0.852	-0.465	-0.755
	Asymp. Sig. (2-tailed)	0.394	0.642	0.450

VI. DISCUSSION

The results of this study indicate that banner ad position does not impact banner ad fixation, brand awareness, and product knowledge. This study partially confirms the results of prior research that position does not affect fixation and recognition [1, 2, 5, 7]. On the contrary, it is inconsistent with previous findings [4]. Those findings show that lower visual field attracts more attention (fixation, click and recognition). However, the results of this study indicate that mean values of recognition at the bottom position are higher than at the top position, but the difference is not statistically significant. One possible explanation is a difference in experiment settings. This study used a single content webpage (the restaurant review) with an aim to minimize distraction of participants' attention. As a result, eye movements of participants seem like reading. However, in [4], a multiple content webpage was used, which can cause eye movements to be relatively random. Thus, if the banner ad's position is close to a more interesting content, it is more likely to attract eye movements, but the effect is not necessarily the result of the banner ad position itself.

This study also investigated two moderator variables, congruence of banner ad content and webpage content, and advertising objective. However, these two variables do not have an impact on banner ad fixation, brand awareness, and product knowledge. Although, the congruence of banner ad content and webpage content do not cause an impact, we found a conflict of mean values of product knowledge. When the two contents are congruent, the mean value of product knowledge at the bottom position is higher rather than one at the top position. On the other hand, the mean values are converse when the two contents are incongruent. If the number of participants increases, the results will probably be clearer. For banner ad position and advertising objective, these results do not confirm that position and objective have an impact on effectiveness of advertising [8]. An obvious difference between our study and [8] is types of banner ad used. In [8], animated ad was used, while static ad was used in our study.

VII. CONCLUSION

This research has three main results as follow:
1) Banner ad position does not impact banner ad fixation, brand awareness and product knowledge.
2) Banner ad position does not impact banner ad fixation brand awareness and product knowledge when banner ad content and website content are congruent or incongruent.
3) Banner ad position does not impact banner ad fixation, brand awareness and product knowledge when advertising objectives are to inform or to persuade.

Those three conclusions as mentioned above suggest that banner ad fixation, brand awareness and product knowledge do not depend on banner ad position, at the top or bottom of webpage. Hence, to select banner ad area (top or bottom) on any one content webpages (e.g. restaurant review), business owners can choose a cheaper area without concerning these three factors: position, congruence and advertising objective. On the other hand, business owner should concern about other factors such as a number of visitors, target group and popularity of website.

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