# If the Design of Express Waybill Influences Customer's Parcel-seeking?

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**Abstract.** Nowadays, college students have become the main flow of online-shopping, hence positioning their own buying in express bulks is getting more and more difficult. In order to figure out how to easily seek out their names on express waybill and fetch their express, an experiment is being conducted to identify on which part the students' name shall be noticed first. 36 college students (except freshman) from 3 different majors (12 from each major) were tested with the collecting and analyzing of Dikablis by being shown pictures of 4 different express waybills with consignee information on different part of them. The analysis result from relative software shows that consignee information set at parts with larger number of fixation point and longer duration are likely to reinforce the significance of consignee information. Consequently, the consignee information is recommended to set at parts for the sake of students' convenience.

## 1. Introduction

Express in campus has experienced spectacular growth with rapid development of online shopping. Confronted with some many parcels at the same time, students often fail to find their own items easily, especially with a huge number coming with some special festivals. The phenomenon that a cluster of students aggregate before express bulks occurs every single day. As the unique identification sign of commodity, express waybill contains not only the waybill number and its matching bar code to query the state of express but also user information to ensure the identification and accuracy(Zhiling S., 2016). Hence the location of consignee information plays important part in students' quick seeking for their express which is the last step before they get their commodities.

Recent years with the development of e-business and campus economy, express at home and abroad has come to a new development summit which brings campus express business to life. (Yi W., 2013) University students are becoming the main objects of express industry service along with the population of online shopping among them, which severely promotes the role of express in campus. In 2015, the number of packages sent to universities occupies around 6% of the total.( Report on campus express industry development, 2016) While the service capability and standard of current campus express business cannot provide increasing and dynamic personalized demands for students and teachers, it remains to be improved. But population density in university is far lower than in urban area, usually a half or a third. Under this, logistics distribution cost hovers high. Consumption in college also has its features reflected on high consuming frequency. As is shown by data from Ali Academy, in 2015 mean consumption of university students on online shopping is about 1000 yuan, and every student received about 16 packages on average. In this situation, logistics market of express gives an answer by changing distribution model, transport distance and logistics scale. The new model

aggregates logistics scale and converts the traditional model of couriers' distributing goods to students to students' finding their own package so that the mean logistics transport distance gets reduced. In addition, university students' has comparatively low consuming ability but enough time, henceforth self-service delivery prevails in campus.

## 2.  Literature Survey

However, today's express companies have respective design that differs from others on the layout of waybill, which has a great effect on the significant influence of different areas of waybill, consignee information herein. From theoretical level, vision psychometric can explore which part eyes locate first and then where to transfer(Ning C., 2001). In such visual research, location setting weighs higher than other factors among the significance influence factors on mineral safety signs(Shuiying T., 2016). Human visual system can quickly and accurately focus on a few salient objects in image and video. This object is called region of interest (ROI, for short) and it is widely applied in the acquirement of words and signs. (Gang Y., 2013). Modifying the layout of website can increase effective Midas Touch therefore raise learning efficiency(Lu A., 2011).

Different location settings have different impacts on significance influence of mineral safety signs. When safety signs are set at right and upright area, they attract more attention and therefore can reinforce the significance of safety signs(Shuiying T., 2016). In this study, the concept of attention is understood in the sense of "the ability to select part of the incoming stimulation for further processing" ability. Considering response time and adequate information on safety signs, drivers should pay more attention on location of upcoming traffic signs(Hongliang X., 2010). In campus, downright location setting of safety signs can be noticed easily and enhance their significance(Siqi L., 2016). On print advertisement designing, typesetting fascinates people to different degree. The numbers of fixation and gaze duration on the left in an advertisement are more than these on the right, up more than down(Keqin W., 2005).

From the literature review we find that most experiments were conducted using a specific object embedded in different background and circumstances to test which area grabs people's attention first, and altering different location setting to examine which kind of layout makes people more clear. Here, the question is how do students scan the waybill of express and which kind of layout is capable of catching students' eyes more easily. So the most effective measuring way of record performance eye-tracking experiment was performed. The eye-tracking tools Dikablis, which can perfectly record the time parameter of eye movement course was introduced in this experiment. The experiment tries to figure out which area people are likely to locate for seeking specific items like names or other marks in consignee information area so as to get their parcels. On the basis of knowing the name information he need to find out in advance, participants were arranged in lab setting wearing moving eye tracker looking at the materials shown to them. The experimental materials contain different layouts with consignee information on the upper-right or left-bottom area of waybills. This experiment wants to find out which part of the waybill are participants' visual saliency habitually, and thus proposes the proper and reasonable one.

## 3.  Proposed Method

### 3.1. Participants

In total, 36 university students were recruited in the experiment from Tianjin University of Technology. None of them had such experience before, so their visual saliency could be maximized. All participants had normal or corrected to normal visual acuity and had no history of psychiatric or neurological disorders.

### 3.2. Material

Consignee information is the most necessary and convenient content for students to position their own express. In the experiment, 4 waybills with two kind of similar layouts from four familiar express companies were used in a form of picture present to participants(Hilberink, 2016). Of the 4 pictures, two have the consignee information area vertically paralleled by shipper information area and located

beneath (layout 1); the other two have the consignee information area horizontally paralleled by shipper information area and located right to it (layout 2). All of the waybills are from several mainstream express corporation. In this study, the consignee information area was defined as area of interests (AOI) and measured by an eye-tracking experiment. To track the eye-movement, Dikablis was used, it can capture one's pupil, and record the visual tracking and then as an external tools transmit it to the computer and show it on the screen.

### 3.3. Design
A mixed design was used in this experiment. The participants were shown to both two kinds of layout waybills, but merely one version of waybills could be seen once. In overall, each participant saw two waybills of layout 1, and two of layout 2. All the visual tracking data was collected and recorded by Dikablis. The two kinds of layout were shown to participants interwoven. It began with a picture of layout 1, and then layout 2 and moved forward till all the pictures were shown. This way of showing pictures wasn't told to participants in advance.

Among those of eye movement measurement indices, time to first glance, screen number of glances and AOI attention ratio. Time to first glance refers to time expenditure when eye moves into the AOI. It's an important index because the less time it takes, the easier the eye captures the information you need. Screen number of glances means the times that eyes are steadily fixed in AOI for at least 100 ms(Fang-yuan C., 2015) and that people recognize and process image. If the number goes high, participants appear to be more attentive to AOI or confused about the area. Here, the large number means more attention due to lack of complex texts or images. AOI attention ratio equals to the ratio of fixation duration and AOI duration and reflects the attentive level of the area. High attention ratio denotes high attentive level, and vice versa.

### 3.4. Procedure
Before the experiment, calibration of Dikablis was conducted. The participants were exposed some irrelevant pictures prepared before. At the beginning of the experiment, every participant was given a guidance about the experiment. The participants were informed that they would see six waybills one by one, and they were told to look at the waybill as they always did, searching for the specific name shown in consignee information area. It was noted to them that there's no time limitation, and when the specific name was found, tip the space key on keyboard to do the next one. Then came the actual experiment. The participants were asked to see six consecutive pictures one by one, and control the time by themselves. When they completed to find the specific information, they should tip to turn to see the next picture. There was a blank white picture between any two pictures of waybills to eliminate residual vision. Every experiment lasted about 8 minutes.

### 4. Experimental Results
The data collection and evaluation criteria based on precedent evaluation strategy are listed as follows, see Table 1. The experimental data are collected by the eye tracker, and the average of all data is seen as the final outcomes rounded to 3 decimal places except number of glances.

**Table.1**

| Data collection | Data evaluation criteria |
|---|---|
| Time to first glance [s] | Low value means easy to position |
| Number of Glances | Low value means easy to accomplish the goal |
| Total Glance time [s] | Low value means easy to accomplish the goal |
| Mean Glance Duration [s] | Low value means easy to understand the AOI |
| AOI Attention Ratio [%] | Low value means easy to position |

Table 2 shows the statistical data after calculation and processing. Time to first glance of waybill 3 and waybill 4 are much less than of waybill 1 and waybill 2. That is to say, the AOI in waybill 1 and waybill 2 can more easily be found. Also, the value of total glance time displays a similar result that the specific information in waybill 3 and waybill 4 is captured easier taking much less time than in waybill 1 and waybill 2. Though number of glances in waybill 1 and waybill 2 outweigh that in waybill 3 and waybill 4, their total glance time is much higher than waybill 3 and waybill 4 at the same them. In terms of mean glance duration, waybill 3 still takes the least. Mean glance duration of waybill 1 is 0.438, twice more than the second value of waybill 4. It can be illustrated that AOI in waybill 3 is more convenient to be understood than in waybill 1. As for AOI attention ratio, waybill 3 and waybill 4 possess only one sixth, even not as much as half of waybill 1 and waybill 2. In fact, with the AOI's covering about one fifth of the waybill in area, one sixth of AOI attention ratio counts not too small. On the contrary, more than one fourth of AOI attention matched with high time to first glance denotes its comparative difficulties in positioning and finding out the specific information. In other words here, bigger does not always means better.

**Table.2**

| Data collection | waybill 1 | waybill 2 | waybill 3 | waybill 4 |
|---|---|---|---|---|
| Time to first glance [s] | 4.202 | 3.404 | 2.168 | 2.124 |
| Number of Glances | 5 | 8 | 4 | 4 |
| Total Glance time [s] | 2.192 | 1.536 | 0.656 | 0.864 |
| Mean Glance Duration [s] | 0.438 | 0.192 | 0.164 | 0.216 |
| AOI Attention Ratio [%] | 27.132 | 37.381 | 16.881 | 17.862 |

Table 3 clusters the four waybills into the two kinds of layout as defined in material part in Method. As is seen in Table 3, layout 2 has and overwhelming advantage upon layout 1 in every variant. Waybills of layout 2 has an overwhelming advantage upon of layout 1. Layout 2 costs 2.146 s on average to first see the AOI, only a little more than half of layout 1. That's a huge gap between the two kinds of layouts. Meanwhile, AOI attention ratio of layout 1 is nearly twice of layout 2. So on layout 2, AOI can be found and positioned more easily. Also another thing gets verified from mean glance duration that the same AOI in layout 2 gets understood faster than in layout 1, with layout 2's mean glance duration weighing two third of mean glance duration in layout 1. In summary, if consignee information, the AOI in this experiment, stands at the upper-right position of waybills, paralleled right next to shipment, just as called layout 2 above, the waybill is more probable to catch participants' attention and understanding. In this experiment, layout 2 is superior to layout 1 in structure, and it has clear advantages. So layout 2 is the preferable one.

**Table.3**

| Data collection | layout 1 | layout 2 |
|---|---|---|
| Time to first glance [s] | 3.803 | 2.146 |
| Number of Glances | 6.5 | 4 |
| Total Glance time [s] | 1.864 | 0.76 |
| Mean Glance Duration [s] | 0.287 | 0.19 |
| AOI Attention Ratio [%] | 32.2565 | 17.3715 |

## 5. Conclusion

These years, eye movement data captured and recorded by eye tracker are usually introduced to analyze availability of human-computer interaction, such as web page design, multimedia course study, advertising effects and so on. The visual attention and habits are significant and they have huge research potentials. They cast off the traditional qualitative methods and veer into quantitative research level. There's no doubt that if more emphasis are put and good use are made, they can radically benefit our life.

This study has displayed that different layout on waybill with relative position in discrepancy in relation to a pick of package in scattered express parcels affects both visual attention and final pickup. The result shows that if the consignee information is set on upper-right of the waybill, it can gain notice more easily than on down-left of the waybill. There exists a piece of improvement for waybill design, and if that's done it will be convenient for consumers to pick up their express parcels. In another facet, there will be a promoted distributional efficiency and slashed time cost so as to save a big deal of logistics costs. This study also has contributions to other design with the process of information searching. To make a proper arrangement for layout makes difference.

Also there are still some defects in this experiment needed to be improved hereafter. The participants selected in this experiment are just students, and people from broader fields also can be introduced into this verification. Then the experimental pictures of waybills are merely adjusted to a similar size. There's no relevant regulations or unified standards for the design of express waybills, so every express corporation's waybill has its own style, nothing more is processed except unifying the size. That's also the place that can be improved.

**References**

[1]  Lu, A., Ziyun, L., "An Experimental Study of the Use of Eye Tracker in Website Optimization" Distance Education in China, No. 5, 2012, pp-87-91,96

[2]  Fang-yuan, C., "Usability Evaluation of Smart Phone Application Graphic User Interface Based on Eye-tracker", Packaging Engineering, No. 8, 2015, pp-55-59

[3]  Gang Y.: "ROI Extraction for Stereoscopic Video based on Visual Attention", 2013, Dissertation, Zhejiang University.

[4]  B. Hilberink: "Does the use of a foreign language influence attention and genre-specific viewing patterns for job advertisements? An eye-tracking study", Information Processing & Management, Vol. 52, No. 6, 2016, pp-1018-1030

[5]  Hongliang X., Boming T.: "People in Chongqing and analysis and rectification measures of interchange road guide signs", Highway, No. 11, 2010, pp-141-144

[6]  Hongxia L., Siqi L.: "Analysis on validity factor of coal mine safety certificate based on order relation method", Coal Economic Research, No. 3, 2017, pp-38-42

[7]  Shuicheng T., Ying C., Yuan Z., Guangli L.: "Analysis of factors influencing effectiveness of mine safety signs", China Safety Science Journal, Vol. 26, No. 2, 2016, pp-146-151

[8]  Yi W., Qinghua Z.: "Discussion on Optimization of logistics courier services on campus", Science & Technology Vision, No. 7, pp-93,191.

[9]  Zhiling S.: "Delivery service chain redesign based on the express waybill optimization", Art Science and Technology, Vol. 29, No. 1, 2016, pp-258-259

[10] CECRC, "Report on campus express industry development", China E-Commercial Research Center, 2010, http://b2b.toocle.com/detail--6364227.html.