Marek Zachara*, Cezary Piskor-Ignatowicz*, Lidia Dutkiewicz*,
Katarzyna Grobler*, Patryk Orzechowski*, Dariusz Pałka**

Assessment of the Ergonomic of Polish Major News Portals Based on Analysis of People's Behaviour while They are Browsing for Information

1. Introduction

The World Wide Web (WWW), with its Hyper Text, HTTP protocol, browsers and immense content has been with us for around 20 years already. This entitles us to consider it at least past its childhood days and growing into maturity. This also means that many services available in Internet have grown up to the point where the details start to matter since the core has already reached perfection. Yet, there has been surprisingly few number of published work related to web pages ergonomic. The noticeable exception is J. Nielsen web site dedicated to web usability (http://www.useit.com) and publications of Dominique Scapin and his team [1, 3] and [4].

In this paper, we will focus on one of the services available in Internet, i.e. news delivery (by news portals). Specifically, we will compare the ergonomic and user reception of major Polish portals (namely: Onet, Interia and Wirtualna Polska – WP). Considering the fact there is a difference in market share of these three key players, we will try to find the advantages and disadvantages they have, and how do they utilize them for their benefit. Since (as it will be pointed out later), the web surfers using these portals do not consider the content they provide significantly different, this is an important indicator that the reasons behind the success (or lack of it) might be related to secondary aspects of the service like: page layout, ease of use, added services, etc. This also strengthens the initial claim that Internet is maturing – since competitors start to provide really similar product and need to differentiate on secondary features.

  * AGH University of Science and Technology, Krakow, Poland
 ** Pedagogical University of Krakow, Poland

1.1. The vested interests of portal owners and web surfers

Before we start analyzing the layouts' of the portals, it is important to understand that they are usually a compromise between the needs of the portal owners (suppliers) and the web surfers (customers). The goal of the web-surfer is to find quickly the information they are looking for, while the primary target of the portal is to generate income for delivering advertisements to its users. As advertisers are usually charged per impression (display) of an adveriement to a customer, the income created for the portal by the user is directly related to the number of pages viewed by the user. As a result, the portals may tend to organize their pages in a sub-optimal way in terms of information retrieval for the web surfers. Although such behaviour was never officially admitted, it should be kept in mind while analyzing the results.

Before going further, we'll have a look at the analyzed portals' market share in Poland, based on Megapanel [5] data.

Table 1
Portals' usage statistics for users aged 15–24 years

Name	Coverage	Users	Impressions	Time spent by user
onet.pl	76.86%	3 481 557	937 772 804	4 h 45 m 59 s
wp.pl	66.34%	3 132 989	564 753 177	3 h 26 m 29 s
interia.pl	62.39%	2 946 690	349 585 373	3 h 04 m 27 s

*   Megapanel PBI/Gemius data for 05.2009 r. Sample count: N = 3971. Selected group: 15–24 years. Based on demographic structure from NetTrack Millward Brown SMG/KRC.

Table 2
Portals' usage statistics for the whole population

Name	Coverage	Users	Impressions	Time spent by avg. user
onet.pl	73.28%	12 188 094	3 813 178 169	5 h 17 m 39 s
wp.pl	63.71%	10 597 004	2 425 624 405	4 h 12 m 44 s
interia.pl	59.48%	9 892 796	1 314 972 600	3 h 04 m 45 s

*   Megapanel PBI/Gemius data for 05.2009 r. Sample count: N = 18292. Selected group: all 7+ years. Based on demographic structure from NetTrack Millward Brown SMG/KRC.

In Tables 1 and 2, column 'Coverage' represents the percentage of users in the target group that visited certain portal during the mentioned period of one month, 'Impressions' is the number of pages presented by the portals to the users and 'Time spent' is the average time user spent browsing the portal during the month. The group of 15–24 years old (Tab. 1) has special significance for us – and thus the data for it was presented together with the

results for the whole population because it covers the group that was used in experiments presented later in the paper. The 'whole population' means all Internet users in Poland.

As can be seen in the Tables 1 and 2, onet.pl has the most users, however the last of the three (interia.pl) has 85% of the leader's user base. What is most interesting however is the difference in impressions (pages visited by users), and average time spent by user viewing a single page. This is summarized in Table 3 below.

Table 3
Per page view details

Name	15–24 years group		Whole population	
	Pages viewed by user per day	Average time spent viewing a page	Pages viewed by user per day	Average time spent viewing a page
onet.pl	8.98	63.7	10.43	60.9
wp.pl	6.01	68.7	7.63	66.2
interia.pl	3.95	93.3	4.43	83.4

This table shows clearly the important difference between the portals. The average time a user spends viewing one page is similar for onet.pl and wp.pl, but significantly higher for interia.pl. Considering the number of pages visited by a single user per day, Onet.pl has more than double score over interia.pl, with wp.pl in the middle. Since the user base is not that different for all three portals (see Tabs. 1 and 2), it seems we can legitimately assume there is something in the construction of portals itself that makes web surfers visit more (or fewer) pages and spend less or more time on each page. To find out if our assumption was correct, we had set out an experiment that could help to evaluate the «easiness of use» of the portal pages.

1.2. Experiment's goals

Our primary goal was to identify whether the layout of the web pages, i.e. the ergonomy of the user interface has a significant impact on the users choice of portal for their daily needs. To find that out, we needed to rule out other factors, like the quality of the content and familiarity with certain layout.

2. The methodology

Since neither 'easiness of use' nor ergonomics of the layout is a quantitative term, we have decided to use the time needed to perform certain task as a substitute. Naturally, these tasks were related to finding certain information within the portals. Shorter times would

mean that the task was easier to conduct, thus the «easiness of use» was better. Timing the execution was however only one part of each experiment. Inspired by the comprehensive study of gaze tracking for web usability [2], we had also set up an eye-tracking system that recorded the position of the gaze focus during the experiment. Finally, we also concluded an interview with every subject, asking how much time they spend daily surfing the web, what portals do they use and why do they use (or not use) them.
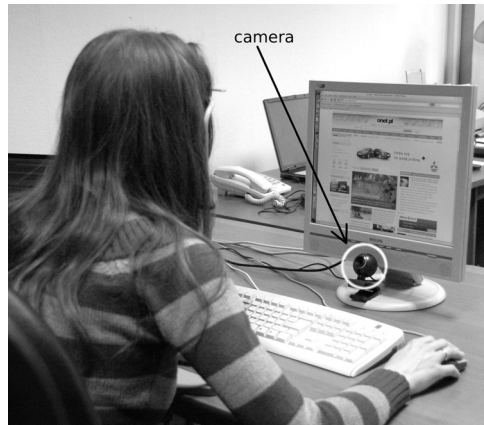

Fig. 1. The experiment set-up and environment

For the purpose of the gaze tracking we have utilized a high resolution (1280×1024) camera mounted below the user's screen (see Fig. 1) and the software provided by Open-Gazer project [6]. Every test session started with calibration of the system, after which the real experiment began when the subjects were given the tasks to carry out. During the experiment, the screen shots of their desktop was continuously recorded together with the position of their gaze. The tasks that were given to subjects were:

– to find the most important information that day,
– to find out the current exchange ration for Czech Crown to Polish Zloty,
– to find out the weather forecast for the next Saturday,
– to find out the movies that will be broadcasted on TV the next weekend.

These tasks were designed to cover various activities, yet not to stray too much from the everyday use. Each tasks were to be performed for each of the three portals (onet.pl, wp.pl, interia.pl). The choice of the portals was made based on the initial popularity poll with the subjects.

Since the experiment required both specialized equipment and extensive interaction with the subjects, the test group was limited to the students of the University, however to achieve as realistic test group as possible we have selected a mixture of both men and women, with various backgrounds (from faculties of humanities as well as engineering).

3. Experimental results and their analysis

As it was mentioned earlier, each web-surfer had a couple of task to perform, during which the time it took to complete them was measured and their gaze was registered together with the real-time capture of the screen. The timing of the tasks is the primary quantitative source of data, while the gaze tracking and the interviews are used to gather qualitative information necessary for identifying user preferences.

3.1. Task timing

Although there were four distinguished tasks given to the users (see chapter 2), we have noted one significant anomaly that made us analyze the first task separately from the others. As can be seen in Table 4, it took users considerably more time to find the most important (according to their opinion) news when using onet.pl compared to other portals. This contradicts the users' opinion articulated in interviews that onet.pl has clean and easy to use layout (see chapter 3.3) and other tasks timings presented in Table 5.

Table 4
Percentage of time to spent to identify the most important news

onet.pl	interia.pl	wp.pl
46%	29%	26%

The feasible explanation of this phenomenon is the similarity of news available in all three portals. Since the majority of the users started their task with onet.pl, they spent most time there, building their knowledge of current news. Continuing their tasks with the other portals, they already had the base knowledge and therefore only compared quickly the content with what they knew from the first portal. As a result, their visit to the later portals was much shorter as they didn't need to read much information.

This learning effect did not apply to the other tasks, as the major problems the users had to face was to find out how to get to the information they were looking for – which was usually located in different places in every portal. However there were significant differences in task completion time between users – even to the order of magnitude. This can be attributed to user experience with portals and proficiency in use of web pages in general. To normalize the results, we used the relative time complexity of a task by comparing the time needed to complete it at one portal with other portals:

$$r_{nau} = \frac{t_{nau}}{\frac{1}{3} \cdot \sum_{p=1}^{3} t_{npu}} \tag{1}$$

where:

t_{nau} – actual time used by user u to complete n-th task with portal a ($a = 1 ... 3$),
r_{nau} – relative time complexity of n-th task for user u with portal a.

Then, all the values for all the users that participated in the experiment were averaged by portal and task:

$$r_{na} = \frac{\sum_{u=1}^{z} r_{nau}}{z} \tag{2}$$

where:

r_{na} – relative complexity of n-th task with portal a,
r_{nau} – relative time complexity of n-th task for user u with portal a,
z – number of users.

Allowing us to sum up the relative complexity of each task and portal in the following Table 5.

Table 5
Average relative time complexity of the tasks

	Exchange rate	Weather forecast	TV programme
onet.pl	1.14	0.79	0.90
interia.pl	0.72	0.91	1.23
wp.pl	1.14	1.30	0.87

Based on this information we can draw a conclusion that although the time required to complete the tasks does not differ much between portals. Onet.pl were on average easiest to use for the web surfers, followed by interia.pl and wp.pl.

3.2. Eye tracking

Apart from timing the task completion, we have also recorded and analyzed users' gaze position while browsing the pages. Although this has not rendered any quantitative data yet it gave us some insight into the poples' behaviour. Sample maps of gaze positions can be found in Figures 2 and 3.

One of the important finding was that users rarely utilised any form of navigation available in portals. One of the most extreme examples can be seen in Figure 3 where user doesn't spend even a second looking at any of the navigation menus. If there was a significant part of the page occupied already by information related to the task at hand (e.g. a weather forecast images or a list of a few major exchange rates), people used hyperlinks in that area to get to the interesting section of the portal, but they virtually never tried to get there using the generic navigation tools. In case the required section was not directly linked from front page, virtually always the users utilized the search engine to get to it. This is most likely an offspring of 'Google Era'; i.e. the domination of search engine as the guide to the internet content. Being so familiar with the search engine and the results it provides, the users seem comfortable with it for any look up of information over internet. Its impor-

tant to note however that often the search engine directed users to different portal they were in – e.g. A user looking for a tv programme in interia.pl were directed to onet.pl by the search functionality at interia. This is the direct result of all three portals using the same generic engine – and yet it may result for them in significant loss of traffic that is of such value for the portals.
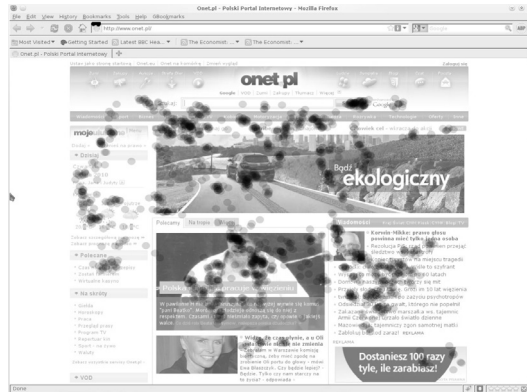

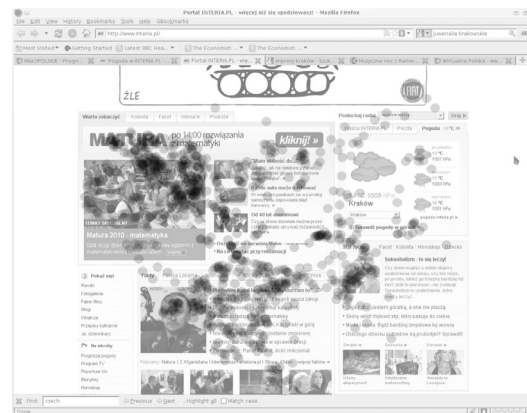**Fig. 2.** Sample gaze tracking map for onet.pl

Fig. 3. Sample gaze tracking map for interia.pl

3.3. Pre- and post- experiment interviews

To improve our understanding of users' approach to the three portals and browsing for information in general, all of them were interviewed before and after the experiment. Primary questions included:

– the frequency of use for each of the portals (onet.pl, interia.pl, wp.pl)
– the major reasons for using (or not using) the portals.

Table 6
Declared primary and secondary sources of information

	Primary	Secondary
onet.pl	54%	8%
interia.pl	21%	4%
wp.pl	12%	29%

The processed results are presented in the following tables. Table 6 lists the portals in respect to being either primary or secondary source of information. We considered a portal to be primary source if the user either declared to use it (on average) several times a day, or at least once a day while other portals were used less often. A portal was considered a secondary source if it was declared to be used at least once a week and didn't match the primary source criteria. The numbers do not sum up to 100% they are relative to the total number of users participating in the experiment (approx. 30), and some of them declared to use other sources of information. The numbers presented in Table 6 shows an interesting pattern – while onet.pl emerges as a clear winner – being the primary source for most of the users, wp.pl is mainly used as a secondary reference – to cross check information found elsewhere.

During the second part of the interview the users were asked to provide their reasons for using or not using certain portal. Although the answers varied greatly (as can be expected), there were a few noticeable common patterns attributable to the portals:

1) Over 80% of the users that provided reasons for using onet.pl mentioned either the clarity of the layout or the easiness to find the specific information they needed (like sport news) or both.
2) Most of the users that declared to use interia.pl stated they do so because they have their mail account there.
3) Most users that provided reasons for not using interia.pl stated they don't like the layout.
4) Wirtualna polska did not receive significant number of positive nor negative comments, apart from a few users who mentioned they use it because they have their email account there.

4. Conclusions

The results presented in this paper support the claim that the usability and layout of the web pages do have significant influence on user reception – and as a result impact the traffic for the web portals. The leader in user traffic of the three major portals – onet.pl has, according to user responses, the cleanest layout which allows them to find information (on average) slightly faster than on other portals (see Tab. 5).

Interia.pl on the other hand has relatively worse reception of layout with significant number of users noting it as a primary reason why they don't use this portal. It has however succeeded in keeping its user base with added value services; i.e. email accounts. Although the average time needed to complete tasks during the experiment is very similar to wp.pl, it is perceived to be more clobbered and difficult to use. We can speculate here that it is partially due to the number of headlines, split into many tabs, which make it very difficult for someone to check all the tabs and as a result leave the person with a feeling they are not up to date with current news.

Surprisingly, no one of the users stated the quality of information provided as the main reason to use one of these three portals. These few people who primarily valued the reliability of information told us they use other sources for their purpose.

To summarize, our research so far have proven that the ergonomic of the web interface is an important factor that influences peoples' willingness to use the service. Based on the data gathered so far it may even seem the primary issue for most of the users. This statement is somehow undermined by the fact that the interviewed group was relatively small and homogeneous, so a larger scale experiment is much desired to improve the surety of the results. There are also other issues that could be verified with larger group, like the tendency to focus gaze more on either left or right side of the screen depending on the person being left or right handed (which we have observed).

References

[1] Leulier C., Bastien J., Scapin D.L., *Compilation of Ergonomic Guidelines for the Design and Evaluation of Web Sites*. Commerce & Interaction (EP 22287), INRIA Report 1998.
[2] Jakob Nielsen, Kara Pernice, *Eyetracking Web Usability*. New Riders Press, 2009.
[3] Scapin D. *et al*., *Towards Automated Testing of Web Usability Guidelines*. Tools for Working with Guidelines, Springer, London 2001, 293–304.
[4] Scapin D. *et al*., *Transferring Knowledge of User Interfaces Guidelines to the Web*. In Proc. of Int. Workshop on Tools for Working with Guidelines TFWWG'2000 (Biarritz, 7–8 October 2000), Springer-Verlag, London, 2000, 293–303.
[5] Megapanel – badania internetu, *http://panel.pbi.org.pl/* NetTrack Millward Brown SMG/KRC.
[6] Opengazer: open source gaze tracker for ordinary webcams, project and documentation: *http://www.inference.phy.cam.ac.uk/opengazer/.*