Initial Search Point Tunneling – A New User Experience Perception Factor in Web Development

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Abstract

This research initially aimed to evaluate the usability of a university website. A qualitative approach was employed, involving a short website questionnaire and eye-tracking recordings. The findings revealed significant and unexpected results, leading to the formulation of new research questions - specifically, regarding (1) the credibility of questionnaire-based data and (2) the observed phenomenon of varying information search effectiveness depending on the user's initial search point (i.e., starting from the website's homepage versus an external entry point). The second phenomenon has been termed Initial Search Point Tunneling. The results suggest potential for faster and more effective information retrieval, which is a foundational activity in Digital Transformation. These insights may have implications beyond the academic context, particularly in the design of websites and internet services, with relevance to User Experience (UX), Customer Experience (CX), and Consumer Behaviour Studies.

Keywords: search effectiveness, User Experience, consumer, Initial Search Point Tunneling, eye-tracking

1. Introduction

Digital Transformation requires common use of digital media. Its widespread use depend on easy and friendly interfaces. Quality ensurance in this field takes usability as an invaluable tool for engineers and entrepreneurs in designing user-friendly websites. However, as both user behaviour and technologies depend on each other and evolve over time, its understanding requires routine checks. One, methodically conducted, was performed and presented here.

The research presented in this paper, has initially aimed at evaluating the usability of a university website. The study included a deliberately diverse sample of expected most frequent users – students - representing different genders, faculties, fields of studies and education levels to ensure its representativeness and divided further into research scenarios based on potentially significant factors, identified by authors. This was done in a way enabling A/B reasoning against measured website perception and information search success. The task consisted of finding simple, yet unknown to participants information, homogeneous for all participants and all Faculties' websites. Results gathering involved short online survey and a recording based on eye-tracking technique.

The outcomes of this research revealed significant, unexpected participants' differences in information search effectiveness, which seemed to be directly dependent on variables presumably held in study - especially on the initial search point (at the website's homepage vs. outside). To the best knowledge of authors, such phenomenon has not been earlier described. This was confirmed by a literature search. Such 'serendipities' can be highly beneficial, as they often lead to advancements, new insights, and have been appreciated by science, and numerous positive examples prove that it should not be undervalued [2], [10].

Therefore the observed phenomenon was named "Initial Search Point Tunneling". Furthermore, observed research gap led to QR_4 formulation.

Obtained results, if further confirmed, may lead to faster and more effective information retrieval, a process which is at heart of the Digital Transformation.. As effectiveness of the information search process is crucial for both users (affecting their satisfaction) and business (their effectiveness), it may ultimately have implications beyond the academic context, particularly providing valuable insights that can be leveraged for the websites and internet-based services design in the area of User Experience (UX), Customer Experience (CX), as well as in Consumer Behaviour Studies. Such wide potential impact on website design reveals that the obtained research results add a distinctive added value and need further investigation.

2. Research objectives and questions

The major initial objective of the study was to evaluate the usability of a university website with a deliberately diverse sample of students to ensure representativeness and additional base for A/B reasoning in fields, which authors identified as potentially significant. Based on these considerations, the following initial research questions have been formulated:

- QR_1: Is information easily found by users on the website?
- QR_2: Are there any factors influencing information retrieval success rate?

The unexpectedly important outcomes obtained by authors encouraged formulation of the new major objective of this study, which became evaluation of the impact of the initial point of search on user behaviour and information search effectiveness. Specifically, to examine how starting from different points (such as a website homepage vs. an external site) affects the efficiency of information retrieval, a phenomenon we term ‘Initial Search Point Tunneling’.

To the best of our knowledge, in existing literature there is still a lack of research on how the starting point of a search influences user behaviour and search efficiency. This gap highlighted, even at its preliminary stage, the need for exploration and to describe this phenomenon. Other minor serendipities in outcomes encouraged additional QR_3 question. As an effect, new research questions derived from multiple predefined differentiating factors and from results themselves have been raised:

- QR_3: Do recorded eye-tracing outcomes show differences against answers collected in the survey?
- QR_4: Does the initial search point affect information retrieval efficiency (measured as information finding success rate)?

This paper contributes to the field by presenting outcomes of the conducted experiment and, based on its results, by introducing the concept of "Initial Search Point Tunneling".

3. Theoretical Background

Both technical and managerial approaches are crucial to effectively translating theoretical insights into strategies that can boost website design and UX. This ensures that the findings are not only academically sound but also practically applicable in real-world scenarios.

One of key development approaches is website usability. Our study is related to components of ISO UX standards [6]. In this context, user-friendly refers to an intuitive and efficient system, highlighting ease, error prevention, and overall user satisfaction [3].

Technological advancements have significantly enhanced the quality of interactions between users and systems. This has led to an increase in sophisticated consumers who expect experiences that match technological improvements. Moreover, research indicates that the quality and user-friendliness of websites are crucial factors, as customers tend to remain loyal to a service due to the perceived friendliness of its use [8]). This can be crucial and decide whether users continue or abandon the website usage, therefore design should include careful consideration of factors that influence their perception and ease of use and prioritize providing access to the information that users expect in the shortest possible time [1], [4]. Notably, university websites are no exception to these design principles. In the aforementioned context, eye-tracking technology is focal in consumer and UX research, offering insights into visual

attention and decision-making process and therefore helps optimize interfaces for improved usability, and aids marketers in understanding consumer interactions [5].

4. Methods

In conducting our research, we adhered to some guidelines outlined in the review of instruments by Darin et al. [3]. For introductory research, a qualitative methodology is appropriate for several reasons. Firstly, websites are inherently complex, and potential usability issues may not be immediately apparent. Secondly, interaction-based processes are best studied using qualitative techniques, as they allow for a deeper understanding of user perceptions and experiences [9]. Consequently, an exploratory approach was chosen for this study, as it is well-suited to uncovering insights in the early stages of research [7].

The primary objective of this study was to routinely examine the usability quality of the Bydgoszcz University of Science and Technology (BUST) website. To achieve this, a purposive sampling method was employed, specifically targeting the most frequent users of the website—students with a small group of participants (due to routine checks nature and main purpose). The study was conducted by the authors in the laboratory of the BUST on 25 full-time students from the Faculty of Management and the Faculty of Chemical Engineering and Technology. This turned out to be comprehensive as well for secondary research objectives, as young people belong to so called cyber-generation, which is a good representation of consumers on a growing e-commerce market. The research was conducted on June 19th-20th, 2023. It comprised two phases. The first phase employed an eye-tracking technique using two Gazepoint GP3 eye-trackers. This was complemented by an online survey, utilizing a structured questionnaire delivered via the Google Forms platform. The questionnaire included both closed and open-ended questions. Both sample group and questionnaire questions were designed in accordance with the A/B methodology, so as to enable checking whether there exist any pairs (or sets) of factors possibly significant for the quality of information search process on the website. Questions covered: perceived ease of finding information (closed question), possible sources of difficulty and improvements (3 open questions), basic information about the respondent (gender, level of studies, field of studies), the study conducted (initial search point: website's homepage vs. a page outside website, here: onet.pl, familiarity: search on one's own Faculty). Full questionnaire is accessible at http://wachowicz.info/other/isd2025 . Additional factors were extracted from recordings (process success and used Search Engines (SE)). Respondents were asked to find vocational meetings planner - information that was unknown to them and consistent across all faculty websites included in the BUST website.

5. Results

Most (72%) respondents described finding information on the BUST website to be easy (definitely yes [8%] / yes [28%] / rather yes [36%]). Only 28% reported finding it not easy (definitely no [8%] / no [4%] / rather no [16%]). This is presented in Figure 1. Considering this result, one might regard the quality of website usability to be perceived as acceptable, which confirms QR_1.

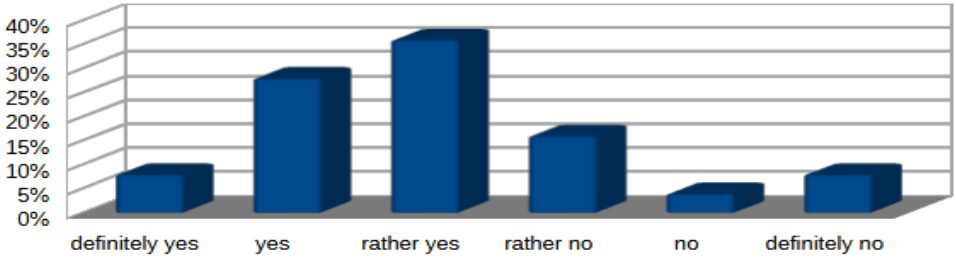

Figure 1. Answers to the question 'Was it easy to find information?'

Suggestions for improvements from respondents are always precious additional information in such research. In this case they illustrate answers to QR_2 - and they hint in

particular (a) among respondents that found searched information - urge more precise information: (P3) "The meeting schedule was marked for all students and not directly for a specific faculty" and (P8)"There is no distinction between full-time and part-time studies on the website" and (b) those, who were less successful – complain on information overload and poor quality of built-in SE (P18) "[there was too] many information" and (P24)"the SE did not indicate the searched phrases, you had to search the website yourself".

A surprising fact, that only 68% (17 answers) of respondents found required information at the website, compared to 72% (18 answers) who claimed that finding it was easy was a trigger for QR_3 formulation. Their correlation (presented in Table 1) confirmed that respondents do not always provide answers consistent with the actual result. One of the respondents who reached the sought information found it rather difficult, but more interestingly - two respondents who, DID NOT FIND the information (as it was recorded), in the form replied that it was rather easy or easy to find, which confirms QR_3.

Table 1. Structure of perceived ease of search depending on the search success

	was it easy to find						
found	definitely no	no	rather no	rather yes	yes	definitely yes	***total***
no	8% (2)	1% (1)	12% (3)	4% (1)	1 (4% (1)	0% (0)	*32% (8)*
yes	0% (0)	0% (0)	4% (1)	32% (8)	24% (6)	8% (2)	*68% (17)*
total	*8% (2)*	*4% (1)*	*16% (4)*	*36% (9)*	*28% (7)*	*8% (2)*	***100% (25))***

After analyzing the data according to the predefined differentiating factors, particularly interesting results were observed in relation to the page where the respondent began his task.

Table 2. Structure of search success depending on the starting point

	planner found		
starting point	no	yes	***total***
onet.pl	23,1% (3)	76,9% (10)	***100% (13)***
pbs.edu.pl	41,7% (5)	58,3% (7)	***100% (12)***
general population	*32% (8)*	*68% (17)*	***100% (25)***

Results presented in Table 2 showed that users that began their search process outside the website surprisingly encountered almost twice the higher information finding failure rate. This led to formulation of a new QR_4, which was confirmed by results. As a further step, authors retrieved from eye-tracking recordings information on the SE indeed used by the respondent and correlated in each case with the initial point of the search process, is presented in Table 3 (no. of observations is larger than no. of participants, as some used more than one method).

Table 3. Structure of search method used depending on the starting point

	search method used				
starting point	menu (without s.e.)	google.pl	onet.pl	pbs.edu.pl	***total***
onet.pl	0% (0)	85,7% (12)	7,1% (1)	7,1% (1)	***100% (14)***
pbs.edu.pl	44,4% (8)	16,7% (3)	11,1% (2)	27,8(5)	***100% (18)***
general population	*25,0% (8)*	*46,9% (15)*	*9,4% (3)*	*18,8% (6)*	***100% (32)***

This shows that users starting at the BUST homepage usually were trying to obtain information within the website, mainly through website's menu, which turned to be less efficient than going straight to Google SE, predominant strategy for participants starting search process on a neutral webpage outside of the BUST website.

6. Conclusions, limitations and future research

The most important findings suggest that users use different methods of searching and obtain different success information search rates depending on the starting point of the search that is given to them, which was named 'Initial Search Point Tunneling'. Results show that, surprisingly, starting the search process at a neutral webpage outside the target website (here: onet.pl) helps finding information sought faster than by starting this process at the homepage of the target website. This may be due to more used external SEs (especially Google) and typical use of internal website menus when starting on a homepage, which due to common

huge amounts of information published at websites are challenging to be constructed effectively. Additional results show, that collecting user opinions is not absolutely objective and therefore confirmed the high value of methods like eye-tracking in gathering sound and valuable outputs.

Obtained results emerged from the presumably methodologically designed usability check of a single website and due to routine usability check nature the sample was very limited (to 25 participants). This causes preliminary nature of the observed phenomenon. At this moment for to be generalized it should be confirmed by research on a larger group and examination of its repeatability both in other age groups and in the scope of other websites.

On the other side, this study was uniquely focused on young users - the cyber-generation, which intensively use digital and internet technologies, so understanding of their responses to different initial search points may be crucial for designing effective and user-friendly websites. Therefore these findings, even at such preliminary stage, provide insights into creating intuitive interfaces tailored to young consumers in a broader sense.

Obtained results indicate that the observed phenomenon may have practical application in high-quality website development. As the search process is core for successful obtaining results, it is at heart of both technical and business quality. As a result, its improvement may lead to better website perception and it should be considered in website development not only as a part of UX and CX, but also in Consumer Behaviour Studies.

Acknowledgements

The empirical research was conducted within an internal University grant BN-WZ-4 and using eye-tracking equipment provided by Bydgoszcz University of Science and Technology.

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