Weekend trip planning made easier: Evaluating a novel OTA system

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ABSTRACT
The usability evaluation of online travel agencies (OTAs) is primarily driven by industry, while academia makes a growing -yet modest- contribution. Planning a holiday with such software is a task that falls within the problem space of interactive information retrieval. Most human-computer interaction (HCI) studies on OTAs are focusing on the evaluation of existing, well-known systems. The aim of this study is to demonstrate a new design with its creation and evaluation process. Taking a very narrow section of travel types, the weekend trips, this paper presents a highly customized user interface with a high level of usability confirmed by multiple evaluation methods. The usability testing results illustrated that the designed system provides a generally effective way of finding a weekend trip, and an appealing interface to enhance the user's experience.

Author Keywords
Online travel agencies, OTA, HCI, information retrieval, usability

ACM Classification Keywords
CCS → Human-centered computing → Human computer interaction (HCI) → HCI design and evaluation methods → Usability testing

INTRODUCTION
Travel planning is a complex decision-making process with many and related dimensions, such as destination, accommodation, activities, and more. The contents and structure can vary greatly in travel plans just as the strategies to create them [6].

For this reason, available travel planning usability studies conducted on OTAs are scoped in such a way to measure only within a context of specific travel type(s) [7-8]. As with evaluation, the same problem emerges when designing a new system in this context (see "Prototype" section). Therefore, the final scope of this work considers the travel type where the destination, method of transportation, and dates are known to the traveler. As a further scoping, we looked at weekend breaks whereby the traveler is visiting a city for a few days within a short-haul. This particular, low complexity, yet popular type of travel shown to be a good subject for creating greenfield designs with limited resources.

RELATED WORK
Research on usability and key components of traveling websites has been sparse. Even though such websites manifest similar characteristics to general use websites, they contain details that can be altered for enhanced user experience. Interesting approaches have been proposed throughout the years for producing a list of best practices when designing a destination website. In such a list, functionality, simplicity and aesthetical appeal constitute the prevailing attributes [4].

Nevertheless, the research focus was mainly on design elements such as the website's first impression, logo, sitemap, captivating images, style and color [1]. Less attention was centered to functional components such as search tools and filters [1-2]. Additionally, most studies have focused on popular American and European based OTAs [3] such as Expedia.com and Skyscanner.com which maintain a well-function and crystallized user interface.

PROTOTYPE
At the first stage of the research, the implementation of a website prototype took place. This prototype allowed users to find and organize backpacking trips by setting various system parameters such as dates, maximum trip cost, and destinations. However, after confronting many issues regarding the complexity of the prototype and the difficulty of evaluating such a complicated system it was decided to change the project's scope.

The new research goal was to test the usability of a system which provides users the chance to find weekend trip offers including flights and accommodation. As a consequence, a new website prototype was designed as a scoped down version of our initial platform aiming at helping users find cheap trips for the weekend.

Prototype Fidelity
The prototype design process passed through several stages of evolution. The first stage involved the creation of a low-fidelity prototype for the backpacking trip planning website. Although this prototype was designed on paper, it contained essential information regarding the system's complexity and perplexed functionality. Figure 1 shows how the backpacking low-fidelity prototype looked like.

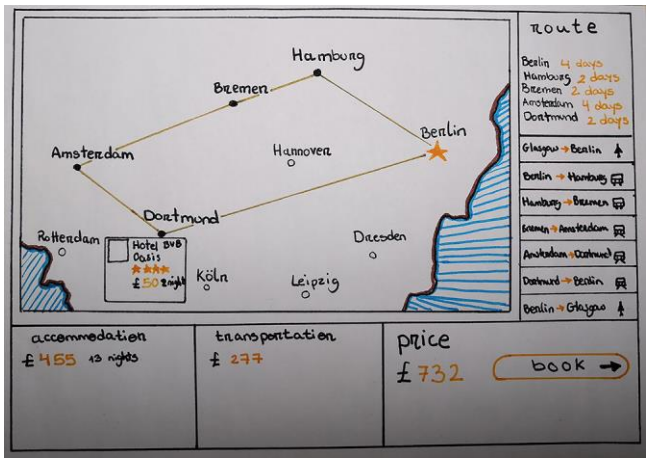

Figure 1. Page of the low-fidelity prototype. This page shows the backpacking trip the system suggested after the users filled in the dates, the maximum trip cost and some destinations they want to visit.

After fundamentally changing the project scope that shifted from backpacking trips to weekend trips, it was made clear to the designing team that a high-fidelity website could be implemented. This upgrade would improve the quality of the evaluation by offering more representative data from the usability testing. The final design was a semi-functional website that operated online and could be accessed through htpp:/staging.weekend.rosian.org. Figure 2 displays a screenshot of the implemented website.

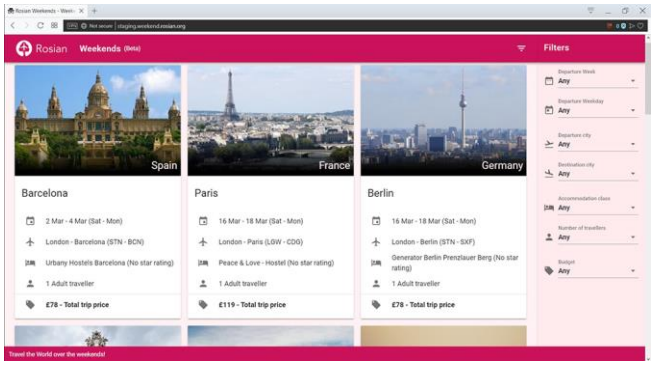

Figure 2. Screenshot of the high-fidelity prototype. This webpage loads various weekend trips and allows users to apply the filters on the right to find their desired weekend trip.

Functionality

The completed prototype gave one main functionality to the users. More specifically, by accessing the website, the user can see several loaded results which in this study case are weekend trips. The user can browse through the results either by scrolling down the page or by using the filter section at the right side of the webpage. The first way of searching is not very efficient since the system randomly loads weekend trip offers. The latter is more dynamic because it allows users to specify and narrow down their searches by choosing different parameters. For example, the user can select the dates of the weekend trip, the departure and arriving destinations, the number of the travelers and the price range of the whole trip which includes both flights and accommodation. For the evaluation part, the participants were encouraged to use the filter section while searching for a weekend trip.

USER EVALUATION

Experiment

In order to evaluate the proposed traveling platform, the collection of user feedback was necessary. For this reason, a task and a corresponding survey were created that assessed different HCI concepts such as usability and design through a number of questions directed to prospective evaluators.

More specifically, the task involved the booking of a weekend trip through htpp:/staging.weekend.rosian.org with the following specifications:

1. Departing from Edinburgh
2. Arriving to Berlin
3. For next weekend (Friday to Sunday)

To achieve a meticulous assessment, the methodology created followed the steps underlined below:

1. Creation of a pilot survey
2. Survey refinement
3. Distribution of final survey
4. Iterate and alter the design

Pilot testing

The first step towards that involved the construction of a pilot test for the survey, focused on key usability components within the website. Two testers were asked in this early stage since the purpose of the pilot test was to identify and accommodate for key feature failures in the platform and record the participants' thoughts and impressions as well as the time they spent for the task. It was thought that the pilot test insights may lead to further refinements in the design and survey format. The pilot tests created were two: one for planning a backpacking trip (out-scope) and one for the weekend trip planning (in-scope).

For the first pilot, the questions were inspired from an extensive user engagement study [5] but were dropped because of the questions' incomprehensibility and the task's complexity which required the planning of a multi-destination vacation. As a consequence, the second pilot's scope was altered to weekend trips so that the usability evaluation be on the focal point and the complexity of the task be reduced. The changed task was adapted to the high-fidelity prototype that was developed after changing the scope of the project and focused on weekend trips.

The survey for the pilot test contained open and Likert-type questions evaluating the website's usability. The average time the pilot testers had to spent for the survey was around fifteen minutes and both described the questions as comprehensive and clear. Those facts constituted good indicators to proceed with the user testing and the survey

finalization. The questions used are described at length in the User testing section.

User testing

Participants

After the task and questions finalization, the distribution of the survey took place in 2 iterations for design alterations be possible while surveying. In total, 24 participants were conducted, 12 for each iteration. Each participant completed the survey at his/her own pace while using his/her own laptop. The testers taking part in the usability testing were students from the University of Glasgow with ages that ranged between 21 and 27.

Iteration 1

At first, the participants were asked to "mentally" organize the trip and describe in a few lines the necessary steps for this imaginary trip booking. In such a way, missing steps and procedures could be identified and added to the design. After that, the testers had to navigate to http:/staging,weekend.rosian.org, book their trip through the platform and provide useful feedback. The key questions were limited to the website's aesthetical appeal, usage of pictures and filters, if it is well-organized and what possible alterations can be made to enhance the current design.

The usability of http:/staging.weekend.rosian.org was tested through the following questions regarding key website elements:

1. What actions will you take for booking your 'mental' trip?
2. Was it difficult to find the trip?
3. Was the amount of time spent to find the trip too long?
4. Was http:/staging.weekend.rosian.org confusing? Explain
5. Was http:/staging.weekend.rosian.org aesthetically pleasing? Explain
6. Is all the necessary information displayed? Explain
7. Was the information on the website well-organized? Explain
8. Did the filters help you find the trip?
9. Did the pictures help you identify the destination you are looking for?
10. What would you change on the website?

The survey was completed at around 15 minutes on average as measured in the pilot tests and all the testers stated that both task and survey were comprehensive enough and easy to complete.

Iteration 2

For the second iteration, the 'mental' trip organizing task was removed as the answers were not highly relevant to the analysis, and a supplementary task was added for further evaluation. More specifically, since the initial task was easy and short in time, the participants were asked to plan a second weekend trip of their own preference. The survey consisted of the same questions but the participants had to complete both tasks before answering them. The inclusion of a more open task could provide more insights for the use of certain website components such as the destination search box and the information displayed on the 'deal tab'.

RESULTS

For the usability evaluation, the 24 participants were split in half for each iteration. The results will be presented separately for each one. In Iteration 2 the website prototype was altered based on the feedback received from Iteration 1. The implemented changes were: adding a calendar for date selection, including the exact flight hours for each trip deal, and setting the website's main color to a darker tone.

Iteration 1

The results collected from the first iteration provided enlightening information for both the users and their experience using the evaluated website. The answers gathered made clear that three-quarters of the participants would book flights and accommodation separately if they were to book the described weekend trip.

When asked to find the weekend trip through http:/staging.weekend.rosian.org, 75% of the participants thought the requested trip was easy to find, with the exact same number of them thinking that finding the trip did not require a lot of time (Figure 3). Furthermore, every three out of four participants stated that the website was not confusing (Figure 3), while the rest complained about the lack of results sorting, distraction caused by the bright color, and the absence of a calendar for date selection. The same ratio of participants thought that the website was aesthetically pleasing with 2 participants underlining their objection to the website's color.

After being asked if all the necessary information were displayed on the webpage, 3 participants replied that the exact flight times were missing, 2 were searching for the exact hotel location, while other comments mentioned the absence of the flight company name, a calendar for date selection, and an arrival date filter. Similarly, the two latter comments were given for the question if the website needs any additional filters.

Overall, the vast majority of the participants felt that the information on the website was well organized, with 11 out of 12 participants leaving a positive comment. In addition, two-thirds of the participants thought the pictures were helpful for finding the trip they were looking for. Finally, the participants were asked if they would make any changes to the prototype. Most of the suggestions were already mentioned by the testers while answering the previous open questions. Additional suggestions included the implementation of a search bar and a favorites section.

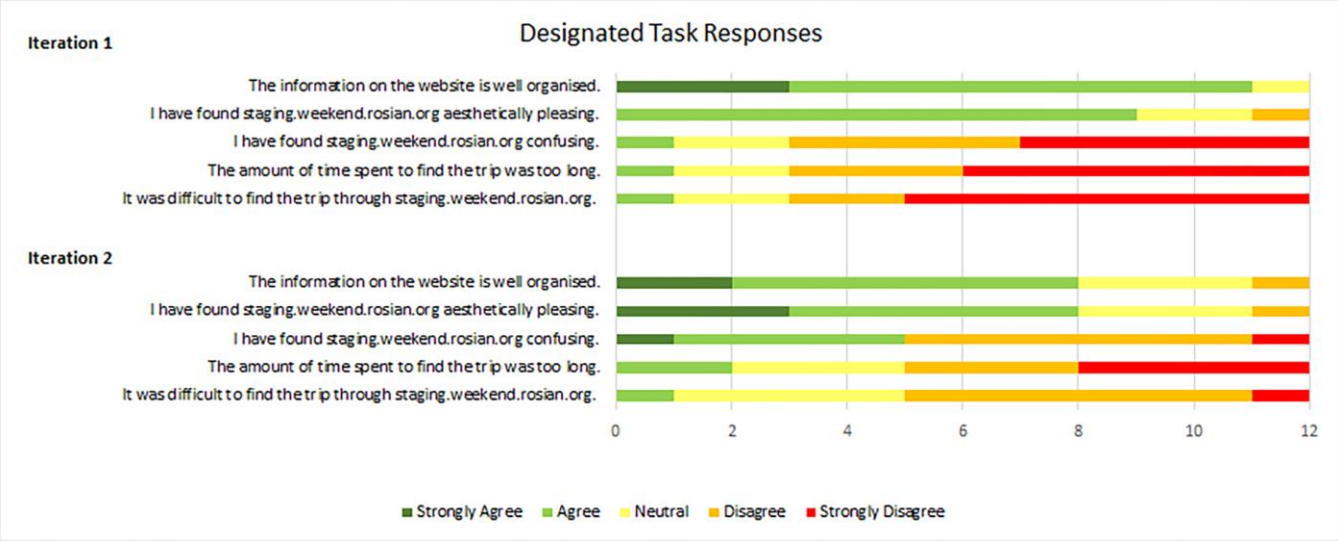

Figure 3. Results based on the designated task in each iteration. The two stacked bar graphs compare the responses before and after the implemented change.

Iteration 2

The second iteration involved, apart from the website alterations, a new survey which added another task similar to the first. In this second task, the participants were offered more flexibility by planning a weekend trip of their choice.

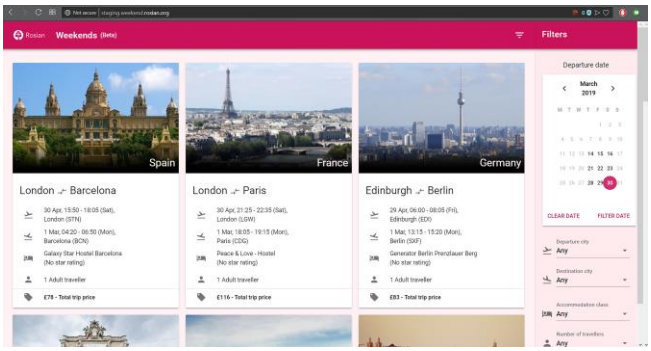

Figure 4. Screenshot of the prototype after the changes that were suggested in Iteration 1. Through the updated website the user can select dates through the calendar and click on 'Filter Date' to see the new results. The pink color is slightly darker and the exact flight times are displayed for each deal.

The second survey's responses for the first task aligned with those in the first survey in most cases. In more detail, 66.7% found the prototype aesthetically pleasing while 65% of the website's users thought that the time needed to find the specific trip was not too long. In addition, 8 out of 12 participants felt that the information was well organized and 7 out of 12 that the website is not confusing (Figure 3). This time the comments mainly stated that the interface was plain and basic and the pictures should be more vivid and appealing.

On the negative side, 41.7% of the participants found the website confusing in contrast to only 8.3% of Iteration 1 (Figure 3). Based on the participants' comments this confusion lies on the fact that some of them were unable to select the date of their arrival, and that the 'Filter Date' button had to be clicked after selecting dates in order to see the results. Another negative shift was observed when the participants were asked about trip search difficulty. In detail, 2 participants were added to the 'neutral' fraction, reducing the percentage of those who found it an easy process (Figure 3). The feedback that justified these reactions indicated the lack of result sorting, the positioning of the filters, and the difficulty of choosing the trip dates.

Other replies mentioned the absence of the airport name, the trip duration, and the flight class. Respectively, the additional filters the participants of Iteration 2 proposed were a time constraint filter, a direct/indirect flight filter, and a rating filter. Lastly, additional suggestions included offering one-way flights, presenting more appealing pictures, and adding a button that clears the current search.

Figure 5. Results of the 'free-choice trip' task. These pie charts exhibit the responses of the participants after using the website for the second time in order to find a trip of their liking.

As shown in Figure 5, the feedback from the second task of Iteration 2 was more positive compared to the first task. More specifically, 83.3% of the participants agreed that the trip of their choice was easy to find. The exact same percentage also thought that finding the trip was a short process and that the website was not confusing. Similarly, the percentage of the participants who believed that the information on the site was well organized significantly increased to 75%.

DISCUSSION AND CONCLUSION

This study has yielded some valuable conclusions regarding the usability of the implemented website prototype. The first Iteration of the usability testing made clear that the majority of people book their flights and accommodation via separate online platforms. For this reason, an online tool like weekend.rosian.org would be proven extremely useful. The reason behind this is that it allows users to find and book a weekend trip including both flights and accommodation based on their preferences. Moreover, the overall impression from the evaluation indicated that:

- the pink color of the platform could be distracting
- there were essential information missing such as the exact flight hours
- the users were more used to select dates through a calendar date picker.

Based on these indications, the website was updated. The color was changed to a darker tone of pink, the exact flight times were included in every 'deal tab', and the date selection was changed from a drop-down list to a calendar form (Figure 4).

However, the results from the second Iteration displayed that the participants found the same task a bit more difficult and long, and the website significantly more confusing and marginally less aesthetically pleasing. On top of that, there were more negative comments about how well the information was organized on the webpage. This means that the implemented modifications were not really effective and unable to lead to the desired results. The problem could be spotted in the new way of date selection. In particular, when the participants selected the trip dates through the calendar picker, the results would not show up automatically since there was the need of clicking an additional button (Figure 4).

Remarkably, the responses after the second task of Iteration 2 were exceptionally more inclined towards the website and its usability. In greater detail, the participants pointed out that the task was easy and short in a percentage that was higher than the first Iteration's corresponding percentage. Likewise, the overwhelming majority of the participants thought that the information was well organized and they disagreed that

the website was confusing. This could mean that the learning effect implied after completing the first task helped the users through the second task and provided an informative experience of how the system functions.

Overall, the largest share of the participants thought that weekend.rosian.org is well presented, sharp and efficient and is regarded as a useful tool for finding a weekend trip.

Limitations

Our usability evaluation was excessively constrained by two major factors. First of all, the small number of participants that completed the test was insufficient to draw clear conclusions. The initial plan of the testing was set to four iterations of six participants each. However, the feedback received from the first six users was inadequate to observe any patterns. Hence, the number of iterations was reduced to two, with twelve people participating in each iteration. Additionally, the open question answers that were given by all the participants were generally unique. Thus, in order to shape patterns and groups of useful answers, the total amount of participants should drastically rise.

The second significant constraint that limited the usability testing was the lack of time and resources necessary to update weekend.rosian.org. The team has decided to develop a high-fidelity prototype so that the usability testing could be more accurate. On the downside, a high-fidelity prototype can be less flexible to modify and update and any changes could be regarded as time-consuming and resource demanding.

FUTURE DIRECTIONS

For future research, it would be very intriguing to conduct further iterations of the usability testing. Each iteration offers helpful feedback that can lead to additional improvements and can shape a complete and user-friendly website. In the future, more aspects of the webpage could be examined. The focus should be on:

- The efficiency of weekend.rosian.org, (e.g. 'How long does it take to complete a certain task?')
- The optimization of the user interface, (e.g. 'How representative are the displayed pictures?')
- The evaluation of one-click booking functionality, (e.g 'How this functionality would affect the usability of the website?')
- The inclusion of additional filters (e.g arrival date filter, time constraint filter, etc.)
- The integration of a map component (e.g a map showing the hotel location)

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