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Human-computer interaction and usability testing: application adoption on B2C Web sites

Pendahuluan, Penelitian ini penekanan akan diberikan pada sektor e-commerce dan interaksi pelanggan dengan situs Web pengecer online. Tujuan dari proyek ini adalah untuk mengevaluasi lima situs web e-commerce B2C Yunani, yang termasuk dalam perangkat keras / lunak dan pasar peralatan rumah tangga. Dalam penerapannya penelitian ini mencoba melakukan evaluasi berdasarkan Sejauh menyangkut standar, yang paling representatif adalah ISO 9241: 1992 (Ergonomi manusia dan interaksi sistem), ISO 13407: 1999 (proses desain yang berpusat pada manusia untuk sistem interaktif) dan yang relatif baru adalah ISO 9241-151: 2008 (Panduan tentang antarmuka pengguna World Wide Web). ISO 9241 sangat menarik karena mengandung definisi dan karakteristik kegunaan. Standar kedua, ISO 13407, mendekati masalah kegunaan dengan perspektif tingkat tinggi [14] [15]. Tujuannya bukan untuk memberikan detail pedoman desain tetapi untuk menyajikan proses desain yang berpusat pada pengguna langkah demi langkah. Proses ini akan memastikan desain sistem yang dapat digunakan, yang akan memenuhi kebutuhan dan kekhasan pengguna. Standar ketiga, ISO 9241-151 adalah standar pertama yang hanya disebutkan pada kegunaan Web dan desain UI Web. Tujuan ISO 9241-151 adalah pembuatan daftar pedoman, yang dikombinasikan dengan pendekatan HCD dapat memastikan kegunaan yang tinggi untuk desain UI Web. Sekali lagi, ketiga standar di atas hanya yang lebih representatif.

Methodologi, Penelitian dilakukan dengan menggunakan Metode Evaluasi Usabilitas (UEM) dapat dikategorikan sebagai: 1) metode analitik (di laboratorium tanpa partisipasi pengguna); 2) metode eksperimental (di laboratorium dengan partisipasi pengguna); dan 3) metode penyelidikan (di luar laboratorium tetapi dengan partisipasi pengguna).

Untuk menerapkan kategori penelitian UEM, penelitian ini menggunakan model ARUT, TAP, dan quisioner SUS. Dengan model evaluasi Heuristik (HE dapat diterapkan baik pada tahap pertama desain dan UI yang lengkap). Secara umum, setidaknya dua evaluator memeriksa sistem dan berdasarkan heuristik, mencoba untuk mengevaluasi kegunaan, mengalokasikan nilai untuk setiap heuristik yang mewakili penilaian mereka untuk UI.

Berikut ini tiga model yang dipilih untuk evaluasi situs e-commerce adalah:

1) Asynchronous Remote Usability Pengujian (ARUT); (Camntasia Studio 7 digunakan)
   Metode yang relatif baru, yang mengeksploitasi teknologi Internet, adalah Remote Usability Testing (RUT). Ramli dkk membagi RUT menjadi dua kategori: pengujian kegunaan remote sinkron dan kegunaan remote asinkron pengujian. Dalam kasus pertama, selama evaluasi, koordinator kegunaan dan pengguna berkomunikasi dan bekerja sama di saat yang sama melalui aplikasi Web. Kehadiran kedua peserta diperlukan untuk penyelesaian sesi. Di kasus kedua, hanya partisipasi pengguna yang wajib. Koordinator biasanya mengirimkan email pribadi kepada pengguna dengan tautan ke tugas evaluasi dan pengguna dapat menjawab kapan pun mereka mau [21].
2) Thinking Aloud Protocol (TAP); (Khususnya untuk implementasi ARUT, alat kegunaan on-line, Loop11, digunakan. Untuk TAP). TAP terjadi di dalam laboratorium, dengan partisipasi pengguna UI yang dituju, dan bukan pakar. Mengenai prosedur evaluasi, ini dapat dikategorikan sederhana dan cepat. Lebih khusus, koordinator uji menjelaskan tugas-tugas yang harus diimplementasikan kepada pengguna. Pengguna, selama pelaksanaan tugas-tugas ini, buat komentar pada setiap tindakan yang mereka lakukan. Pada saat bersamaan, koordinator menyimpan catatan komentar pengguna dan meminta mereka untuk terus berbicara dan menyarankan solusi alternatif berdasarkan saran mereka pendapat dan persepsi ketika mereka menghadapi kesulitan. Apalagi selama sesi evaluasi, setiap aksi dan semua reaksi dari pengguna dicatat oleh penggunaan perangkat lunak pemantauan khusus di desktop, sehingga

setelah itu, moderator dapat menganalisis dan menghubungkan reaksi dengan tindakan yang dilakukan.

3) Kuesioner usabilitas. (Sedangkan kuesioner usability yang dipilih adalah SUS, SUS adalah 10 pertanyaan dengan sekala likert)

Responden, Untuk implementasi ARUT, 120 peserta diundang. Dari 120 orang, 88 merespons secara positif, menghasilkan tingkat partisipasi 77,3%. Dari mereka yang akhirnya setuju untuk berpartisipasi dalam penelitian ini, 41 adalah laki-laki (46,6%) dan 47 adalah perempuan (53,4%). Sehubungan dengan tingkat pendidikan para peserta, 29 telah lulus dari sebuah institut teknologi, 37 memiliki gelar universitas, 19 telah memperoleh gelar Master atau PhD dan tiga menyatakan bahwa mereka memiliki tingkat pendidikan lain. Sehubungan dengan usia, 51 peserta (58%) berada di kelompok usia 18-27 sedangkan Sisa 37 peserta berasal dari kelompok usia 28-47. Menurut data, yang diperoleh dari Pertanyaan 7 dari kuesioner, 29 (33,3%) peserta tidak berpengalaman dengan pembelian e-commerce, 36 (40,9%) menganggap diri mereka tidak berpengalaman atau berpengalaman, dan sisanya 23 (26,1%) bisa dicirikan sebagai pembeli elektronik berpengalaman. Juga, enam peserta lagi dilibatkan dalam implementasi TAP. Di dalam sampel, ada 2 yang tidak berpengalaman, 2 berpengalaman dan yang lainnya berkata: Saya bukan ahli tetapi saya juga tidak terbiasa

Evaluasi, Kelima situs Web tersebut dievaluasi sehubungan dengan 10 komponen terpenting dari situs e-commerce: 1) struktur / navigasi; 2) informasi produk; 3) halaman kategori dan filter pencarian; 4) dukungan pelanggan; 5) mesin pencari; 6) proses pendaftaran; 7) akun manajemen; 8) proses checkout (keranjang belanja); 9) pembayaran dan kebijakan keamanan; dan 10) kebijakan pengiriman dan pengembalian. Empat komponen pertama dievaluasi melalui ARUT dan enam sisanya dengan TAP.

Awalnya, harus ditekankan bahwa masing-masing tugas yang diberikan memiliki tujuan dan tujuan evaluasi yang berbeda. Misalnya, Untuk mengevaluasi struktur / navigasi lima situs Web, para peserta diminta untuk menemukan produk tertentu (berbagai produk dan skenario hipotetis diberikan untuk setiap situs Web). Tujuannya adalah untuk memahami perilaku navigasi para pengguna dan tujuannya adalah agar para peserta menemukan produk yang diminta. Misalnya, dari situs web plaisio.gr, mereka diminta untuk menemukan mp3 / mp4 player yang paling baru ditambahkan, sementara dari multirama.gr Web situs, para peserta diminta untuk menemukan sistem Micro Hi-Fi paling murah. Perlu dicatat bahwa para peserta memulai tugas mereka dari halaman beranda masing-masing situs Web e-commerce. Gambar 1 menggambarkan proses langkah-langkahnya, yang mana diperlukan untuk para peserta untuk menyelesaikan proses evaluasi

Hasil dan diskusi, Secara umum, kelima rentang situs Web menunjukkan tingkat kegunaan yang baik. Ini berarti bahwa situs Web sepenuhnya operasional dan tidak akan mempengaruhi pengalaman pelanggan secara negatif. Namun demikian, peningkatan desain perlu. Lebih khusus lagi, dalam tugas navigasi, tidak dapat menemukan tombol sortir. Ini adalah masalah sederhana yang dapat diselesaikan dengan mengintegrasikan pilihan ke filter pencarian. Kemudian ada pula label tautan yang sama membingungkan peserta sehingga terbuang sia-sia upaya. Pentingnya meletakkan informasi penting seperti garansi produk di tempat yang lebih jelas. Cara-cara komunikasi tidak terkonsentrasi dalam satu tautan (mis. Hubungi kami) dan sebagai akibatnya peserta tidak merasa bahwa sarana komunikasi lain tersedia. Proses velidasi yang tak jelas, posisi tombol keranjang. Proses checkout di semua situs Web benar terstruktur dan dapat digambarkan sebagai sederhana. Tampaknya ada masalah utama dalam komunikasi aplikasi Web dengan basis data. Akhirnya, dalam kebijakan pengiriman dan pengembalian tugas masalahnya adalah karena fakta bahwa informasi itu tidak mudah diakses. Contoh lainnya di mana tidak ada peserta yang dapat menemukan kebijakan pengembalian. Hal ini nampaknya simple namun jika ini dibandingkan dengan situs – situs lainnya semestinya para e-commerce dapat berkaca satu sama lain. Walaupun

nampaknya e-commerce begitu simple namun jika informasi terkait tidak diberikan sedetail mungkin atau ada informasi yang menggantung, tentunya ini memberikan dampak luar biasa pada pelanggan.

Kesimpulan, Dalam proyek tersebut, penekanan ditempatkan pada partisipasi aktif dalam proses evaluasi pelanggan yang dituju. Lima Situs web e-commerce Yunani milik sektor bisnis tertentu dievaluasi. Tiga kegunaan yang berbeda metode diterapkan melalui alat yang tepat untuk pengumpulan data. Hasil penelitian menunjukkan bahwa, secara umum, tingkat Kegunaan kelima situs Web itu bagus tetapi perbaikan signifikan dapat dilakukan. Juga, masalah kegunaan adalah diidentifikasi, yang disebabkan oleh keputusan desain yang buruk atau masalah prosedur internal (misalnya server). Dengan hasil, itu situs Web yang paling dapat digunakan adalah multirama.gr, sedangkan you.gr adalah yang paling banyak masalah. Akhirnya, hasil negatif dari e-shop.gr membuat kesan.

Saran, Sebuah studi yang lebih teliti dari komponen-komponen di mana sebagian besar masalah diidentifikasi disarankan. Misalnya, dalam mesin pencari metode penilaian lain harus digunakan, tetapi dengan peserta yang ahli di bidang Web pengembangan untuk mengidentifikasi masalah operasi lebih lanjut. Studi terperinci tentang efisiensi Web aplikasi dan pemisahan waktu respons setiap sistem juga disarankan.

Catatan Kaki Review

Intinya dalam penelitian ini setelah menggunakan 3 standar ISO yang digunakan untuk evaluasi kemudian ada untuk 3 model dibuat dengan labor maupun secara eksternal. Ini memberikan dampak evaluasi yang lebih rinci, luas, dan banyak sekali yang diperdebatkan, semakin banyak data – data yang dapat dijadikan bahan diskusi. Penelitian ini baik sekali apalagi bagi develop yang ingin melihat perbandingan e-commerce pada umumnya untuk survei atau mendapatkan pengalaman berdasarkan sudut pandang penelitian ini, tentu hal ini belum bisa dijadikan suatu patokan namun dalam garis besar kita dapat melihat hasil dari penelitian ini, lalu melakukan praktek sendiri, lalu hasil kita, kita bandingkan dengan validasi dari beberapa reponden.

Dalam ulasannya detail penelitian menampilkan sebegitu rumitnya penelitian namun memiliki tujuan agar bahasan tidak sempit. Dan dapat melihat sudut pandang dari user lebih luas. Hal ini sesuai denga bidang ilmu dari HCI yang melibatkan ilmu ergonomi, computer science, cognitif science, pyschologi dll. Ini sangat berguna sekali. Terlepas bagaimana luasnya hasil dari pembahasan penelitian. Karena sebagian mencakup perluasan bahasan bukan kah ini jika lebih baik kontribusi melibatkan expert karena terlihat dari hasilnya begitu banyak bahasan yang berasal dari kekurangan dan kekurangan. Oleh sebab itu untuk mendapatkan solusinya kita memerlukan para bidang ahli untuk mendiskusikan hasil apakah ini dapat mempengaruhi sistem secara keseluruhan, atau ada beberapa perlu dipertimbangakan sesuai dengan pendapat peneliti atau dibiarkan saja karena tentu penilaian dari penelitian ini melalui data-data dan reponden hanya mewakili sebagian pengguna saja. Namun ini bisa diadikan pertimbangan.

Sekian

Regards-
Novita Anggraini

RIKA SEFTIANA – 192420033
REVIEW JURNAL

Judul	**:** *Human-Computer Interaction And Usability Testing: Application Adoption On B2C Web Sites*
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Volume & Halaman	**:** Volume 14, Number 1, 2012
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Penulis	**:** Vasilia Peppa, Sarantos Lysikatos & George Metaxas
Reviewer	**:** Rika Seftiana – 192420033
Tanggal	**:** 12 Mei 2020

Tujuan Penelitian

Tujuan proyek ini adalah untuk mengevaluasi lima situs *web e-commerce* B2C Yunani, yang termasuk dalam perangkat keras / lunak dan pasar peralatan rumah tangga. Sektor ini dipilih karena aktanya ditandai oleh tingginya permintaan untuk pembelian lini dari konsumen elektronik Yunani. Juga, terbatasnya jumlah penelitian tentang metode evaluasi adalah utama insentif untuk proyek.

Berikut ini adalah tujuan penelitian:

1. Untuk mengevaluasi (yaitu efektivitas, efisiensi, kepuasan, dll) seberapa dapat setiap situs digunakan untuk konsumen dan untuk memeriksa apakah aplikasi *e-commerce* sedang dikembangkan sesuai dengan desain yang berpusat pada pengguna.
2. Untuk mengukur tingkat keberhasilan, waktu tugas rata-rata, tingkat kesalahan dan tingkat pengabaian melalui kegunaan alternative metode evaluasi untuk memahami pengalaman pengguna.
3. Untuk mempelajari apakah prinsip dan pedoman desain di seluruh dunia sedang diterapkan ke situs *e-commerce* Yunani dan untuk membuat asumsi tertentu tentang hubungan situs *e-commerce* dengan kegunaan.
4. Untuk menyimpulkan situs mana yang paling dapat digunakan dan apakah fakta ini tercermin dalam penjualan.
5. Untuk mengidentifikasi masalah kegunaan dan membuat rekomendasi desain alternatif.

Subjek Penelitian

Subjek penelitian ini adalah Situs-situs Web yang dievaluasi adalah plaisio.gr, e-shop.gr, multirama.gr, kotsovolos.gr dan you.gr. Semua lima situs Web termasuk dalam pasar bisnis perangkat keras / lunak dan peralatan rumah tangga dan dipilih berdasarkan jumlah kunjungan ke mereka. Untuk implementasi ARUT, 120 peserta diundang. Dari 120 orang, 88 merespons secara positif, menghasilkan tingkat partisipasi 77,3%. Dari mereka yang akhirnya setuju untuk berpartisipasi dalam penelitian ini, 41 adalah laki-laki (46,6%) dan 47 adalah perempuan (53,4%).

Assement Data

Menggunakan data kuesioner, Khususnya untuk implementasi ARUT, alat kegunaan on-line, Loop11, digunakan. Untuk TAP, Camntasia Studio 7 digunakan, sedangkan kuesioner usability yang dipilih adalah SUS.

Metode Penelitian

Metode yang dipilih untuk evaluasi situs *e-commerce* adalah:

1. *Asynchronous Remote Usability Testing* (ARUT);
2. *Thinking Aloud Protocol (TAP);* dan
3. Kuesioner usabilitas

Juga, pengukuran untuk efektivitas, efisiensi dan kepuasan dilakukan dengan tujuan untuk mengukur kegunaan dari setiap situs web.

Langkah Penelitian

Awalnya, harus ditekankan bahwa masing-masing tugas yang diberikan memiliki tujuan dan tujuan evaluasi yang berbeda. Misalnya, dalam Untuk mengevaluasi struktur / navigasi lima situs Web, para peserta diminta untuk menemukan produk tertentu (berbagai produk dan skenario hipotetis diberikan untuk setiap situs Web). Tujuannya adalah untuk memahami perilaku navigasi para pengguna dan tujuannya adalah agar para peserta menemukan produk yang diminta. Misalnya, dari situs web plaisio.gr, mereka diminta untuk menemukan mp3 / mp4 player yang paling baru ditambahkan, sementara dari multirama.gr Web situs, para peserta diminta untuk menemukan sistem Micro Hi-Fi paling murah. Perlu dicatat bahwa para peserta memulai tugas mereka dari halaman beranda masing-masing situs *Web e-commerce*.

Hasil Penelitian

Hasil penelitian menunjukkan bahwa, secara umum tingkat Kegunaan kelima situs Web itu bagus tetapi perbaikan signifikan dapat dilakukan. Juga, masalah kegunaan adalah diidentifikasi yang disebabkan oleh keputusan desain yang buruk atau masalah prosedur internal (misalnya server). Dengan hasil, itu situs Web yang paling dapat digunakan adalah multirama.gr, sedangkan you.gr adalah yang paling banyak masalah. Akhirnya, hasil negatif dari e-shop.gr membuat kesan.

Kekuatan Penelitian

- Alat yang digunakan dalam penelitian berupa kuesioner, ini mudah digunakan oleh subjek penelitian.

Kelemahan Penelitian

- Dalam mesin pencari metode penilaian lain harus digunakan, tetapi dengan peserta yang ahli di bidang Web pengembangan untuk mengidentifikasi masalah operasi lebih lanjut. Studi terperinci tentang efisiensi Web aplikasi dan pemisahan waktu respons setiap sistem juga disarankan.

Kesimpulan

Kesimpulan dari penelitian ini adalah hasil penelitian dapat mengevaluasi (yaitu efektivitas, efisiensi, kepuasan, dll) seberapa dapat setiap situs digunakan untuk konsumen dan untuk memeriksa apakah aplikasi *e-commerce* sedang dikembangkan sesuai dengan desain yang berpusat pada pengguna. Dan juga penelitian ini dapat menyimpulkan situs mana yang paling dapat digunakan dan apakah dalam penjualan. Sehingga, dapat dikatakan penelitian ini layak dijadikan referensi pengetahuan yang valid.

Nama : Sapardi

Nim : 192420026

Kelas : MTI Reg B

Human-computer interaction and usability testing: application adoption on B2C Web sites

LITERATURE REVIEW

From the title of this article, it can be understood that the three main areas of concern of the specific project are HCI, usability engineering and e-commerce. The most commonly accepted definition of HCI has been given as: Human- computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them [3], whereas the most common definition for usability has been given as: The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use [4].

If the first definition is observed for a while, the words design, evaluation and implementation are those that stand out and are the link between the two fields. More specifically, HCI provides the principles, guidelines and standards for the design and implementation of interactive systems, while the usability engineering offers all the methods, techniques and tools for the evaluation of interactive systems. When examining the second definition, the words: effectiveness, efficiency and satisfaction arise. These three words are the key features of evaluation and the measurement units of

usability (effectiveness + efficiency + satisfaction = usability). Therefore, any attempt to evaluate the usability of a product should be made according to at least these three parameters. It is certainly worth noting that in international research, other indicators for the measurement of usability have been identified and implemented. For example, Nielsen adds the learnability and memorability and few errors [5], while Hornbaek presents a large number of usability indicators and how they can be measured [6].

AIMS OF THE STUDY

1. To evaluate how usable (i.e. effectiveness, efficiency, satisfaction, etc) each site is for the consumers and to examine whether e-commerce applications are being developed according to the user-centred design.

2. To measure the success rate, average task times, error rate and abandon rate through alternatives usability evaluation methods in order to understand the user experience.

3. To study whether worldwide design principles and guidelines are being applied to Greek e-commerce sites and to make certain assumptions regarding the relation of e-commerce sites with usability.

4. To conclude which site is the most usable and whether this fact is reflected in sales.

5. To identify usability problems and make alternative design recommendations.

METHODOLOGY

The methods which were chosen for the evaluation of the e-commerce sites are: 1) Asynchronous Remote Usability Testing (ARUT); 2) Thinking Aloud Protocol (TAP); and 3) Usability questionnaire. In particular, for the implementation of ARUT, the on-line usability tool, Loop11, was used. For the TAP, the Camntasia Studio 7 was used, whereas the usability questionnaire chosen was SUS.

DISCUSSION

In general, all the five Web sites ranges demonstrated good levels of usability. This means that the Web sites are fully operational and will not affect the experience of customers negatively. Nevertheless, design improvements are necessary. More specifically, in the task on navigation, the participants did not find the navigation in the plaisio.gr Web site to be difficult, but they could not find the sort button. This is a simple problem that can be solved by integrating the option into the search filters. In the you.gr Web site, the similar link labels confused the participants resulting in wasted effort. Simple and not specialised and similar names should be used in the labels.

In the task product description, the e-shop.gr and kotsovolos.gr Web sites should place important information such as product warranty in a more obvious spot. In the task customer support the same problem was detected in the you.gr and e-shop.gr Web sites. The ways of communication were not concentrated in one link (e.g. contact us) and as a result the participants did not perceive that other means of communication were available.

In the task registration, problems arose due to either misleading messages about confirmation of registration or internal problems. The confirmation messages were not clear in describing whether activation via e-mail is mandatory and in the kotsovolos.gr Web site, while the system replied with a message of confirmation of registration, the participants could not login for about

five minutes. In the checkout process, the problems that were identified have to do with the size and position of the buy button and add to basket button. The checkout processes in all Web sites are properly structured and can be described as simple. In the task search engine the participants encountered several problems, mainly in the e-shop.gr, kotsovolos.gr and you.gr Web sites. In the first Web site the problem has to do with the presentation of results, while in the other two, there seems to be a major problem in the communication of the Web application with the database. Finally, in the task delivery and returns policy the problem is due to the fact that the information was not easily accessible. A distinctive example is you.gr, where no participant could find the returns policy.

CONCLUSION

In the project, emphasis was placed on active participation in the process of evaluation of the intended customers. Five Greek e-commerce Web sites belonging to a particular business sector were evaluated. Three different usability methods were applied through appropriate tools for data collection. The results showed that, generally, the level of usability of all five Web sites was good but significant improvements could be made. Also, usability problems were identified, which are due to either bad design decisions or internal procedure problems (e.g. server). By the results, the most usable Web site is multirama.gr, whereas you.gr is the one with the most problems. Finally, the negative results of e-shop.gr made an impression.

Tugas 09

Nama : ade saputra
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Tugas
Membuat ringakasa dari jurnal :
Human-computer interaction and usability testing: application adoption on B2C Web sites

Jawaban
Pada Jurnal tersebut meneliti mengenai issue yang berhubungan dengan Human Computer interaction dan usability Engineering terhadap 5 website ecommerce B2C Yunani yaitu plaisio.gr, e-shop.gr, multirama.gr, kotsovolos.gr and you.gr.

Secara garis besar Penelitian tersebut dilakukan dengan mengukur keeffektifan, effesiensi, dan kepuasan dengan tujuan untuk mengukur usability dari masing-masing website tersebut. selain itu dihasilkan juga saran terhadap masalah yang ditimbul yang berhasil diidentifikasi selama penelitian
Metode yang digunakan :

1. Asychronouse remote usability, (ARU)
2. Thinking Aload Protocol (TAP)
3. Usability quesioner

Partisipan yang terlibat meliputi:
Untuk implementasi ARUT, 120 peserta diundang. Dari 120 individu, 88 merespons positif, menghasilkan tingkat partisipasi 77,3%. Dari mereka yang akhirnya setuju untuk berpartisipasi dalam penelitian ini, 41 adalah laki-laki (46,6%) dan 47 adalah perempuan (53,4%). Berkenaan dengan tingkat pendidikan para peserta, 29 telah lulus dari sebuah lembaga teknologi, 37 memiliki gelar universitas, 19 telah memperoleh gelar Master atau PhD dan tiga menyatakan bahwa mereka memiliki tingkat pendidikan lain. Sehubungan dengan usia, 51 peserta (58%) berada di kelompok usia 18-27 sedangkan 37 peserta sisanya milik kelompok usia 28-47. Menurut data, yang diperoleh dari Pertanyaan 7 dari kuesioner, 29 (33,3%) peserta tidak berpengalaman dengan pembelian e-commerce, 36 (40,9%) menganggap diri mereka tidak berpengalaman atau berpengalaman, dan sisanya 23 (26,1%)) dapat dikategorikan sebagai pembeli elektronik berpengalaman. Juga, enam peserta lagi dilibatkan dalam implementasi TAP. Dalam sampel ini, ada 2 yang tidak berpengalaman, 2 berpengalaman dan yang lainnya berkata: Saya bukan ahli tetapi saya juga tidak terbiasa.

Hasil Penelitian
Secara umum, kelima rentang situs Web menunjukkan tingkat kegunaan yang baik. Ini berarti bahwa situs Web sepenuhnya operasional dan tidak akan mempengaruhi pengalaman pelanggan secara negatif. Namun demikian, perbaikan desain diperlukan. Lebih khusus lagi, dalam tugas navigasi, para peserta tidak menemukan navigasi di situs web plaisio.gr menjadi

sulit, tetapi mereka tidak dapat menemukan tombol sortir. Ini adalah masalah sederhana yang dapat diselesaikan dengan mengintegrasikan opsi ke dalam filter pencarian. Di situs web you.gr, label tautan yang serupa membingungkan para peserta yang mengakibatkan usaha yang sia-sia. Sederhana dan tidak terspesialisasi dan nama-nama serupa harus digunakan dalam label.
Dalam uraian tugas produk, situs web e-shop.gr dan kotsovolos.gr harus menempatkan informasi penting seperti garansi produk di tempat yang lebih jelas. Dalam tugas dukungan pelanggan masalah yang sama terdeteksi di situs web you.gr dan e-shop.gr. Cara-cara komunikasi tidak terkonsentrasi dalam satu tautan (mis. Hubungi kami) dan sebagai akibatnya para peserta tidak merasa bahwa sarana komunikasi lain tersedia.
Dalam registrasi tugas, masalah muncul karena pesan yang salah tentang konfirmasi pendaftaran atau masalah internal. Pesan konfirmasi tidak jelas dalam menjelaskan apakah aktivasi melalui email adalah wajib dan di situs web kotsovolos.gr, sementara sistem menjawab dengan pesan konfirmasi pendaftaran, para peserta tidak dapat login sekitar lima menit. Dalam proses checkout, masalah yang diidentifikasi berkaitan dengan ukuran dan posisi tombol beli dan tambahkan ke tombol keranjang. Proses checkout di semua situs Web terstruktur dengan baik dan dapat digambarkan sebagai sederhana. Di mesin pencari tugas, para peserta mengalami beberapa masalah, terutama di situs web e-shop.gr, kotsovolos.gr dan you.gr. Di situs Web pertama masalahnya berkaitan dengan penyajian hasil, sedangkan di dua lainnya, tampaknya ada masalah besar dalam komunikasi aplikasi Web dengan database. Akhirnya, dalam kebijakan pengiriman dan pengembalian tugas masalahnya adalah karena fakta bahwa informasi itu tidak mudah diakses. Contoh khasnya adalah you.gr, dimana tidak ada peserta yang dapat menemukan kebijakan pengembalian.Sebuah studi yang lebih teliti dari komponen-komponen di mana sebagian besar masalah diidentifikasi disarankan. Misalnya, di mesin pencari metode penilaian lain harus digunakan, tetapi dengan peserta yang ahli di bidang pengembangan Web untuk mengidentifikasi masalah operasi lebih lanjut. Studi rinci tentang efisiensi aplikasi Web dan pemisahan waktu respons dari masing-masing sistem juga disarankan.

KESIMPULAN

Dalam proyek tersebut, penekanan ditempatkan pada partisipasi aktif dalam proses evaluasi pelanggan yang dituju. Lima situs web e-commerce Yunani milik sektor bisnis tertentu dievaluasi. Tiga metode kegunaan berbeda diterapkan melalui alat yang tepat untuk pengumpulan data. Hasil penelitian menunjukkan bahwa, secara umum, tingkat kegunaan dari kelima situs Web itu baik tetapi perbaikan signifikan dapat dilakukan. Selain itu, masalah kegunaan diidentifikasi, yang disebabkan oleh keputusan desain yang buruk atau masalah prosedur internal (mis. Server). Hasilnya, situs Web yang paling bermanfaat adalah multirama.gr, sedangkan you.gr adalah yang paling bermasalah. Akhirnya, hasil negatif dari e-shop.gr membuat kesan.

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Human Computer Interaction

Pada penelitian "Human-computer interaction and usability testing: application adoption on B2C Web sites" menyelidiki masalah yang berkaitan dengan bidang interaksi manusia komputer dan tingkat kegunaan/usablity. Lima situs web e-commerce B2C Yunani digunakan sebagai studi kasus yakni plaisio.gr, e-shop.gr, multirama.gr, kotsovolos.gr dan you.gr. Semua lima situs web tersebut merupakan bisnis perangkat keras / perangkat lunak dan peralatan rumah tangga yang dipilih berdasarkan jumlah pengunjung. Dari kelima website tersebut dilakukan pengujian terhadap 10 komponen penting yakni:

1. structure/navigation
2. product's information
3. category pages and search filters
4. customers' support
5. search engine
6. registration process
7. management account
8. checkout process (shopping cart)
9. payment and security policies
10. delivery and returns policies

Terdapat tiga metode yang digunakan dalam penelitian ini yakni *Asynchronous Remote Usability Testing* (ARUT), *Thinking Aloud Protocol* (TAP), dan *Usability Questionnaires* yang bertujuan untuk mengukur efektivitas, efisiensi dan kepuasan pengguna. Pengukuran ini dilakukan dengan tujuan untuk mengukur kegunaan dari setiap website.

Berikut merupakan hasil yang didapat untuk setiap websitenya:

Web sites	Effectiveness (%)	Efficiency (secs)	Satisfaction (%)
plaisio.gr	73.2	1.289	58.45
e-shop.gr	67.6	1.438	58.17
multirama.gr	74.6	1.499	61.60
kotsovolos.gr	74.1	1.456	57.23
you.gr	61.2	1.423	50.32

Berikut merupakan masalah kegunaan yang terdapat pada setiap websitenya:

Tasks	plaisio.gr	e-shop.gr	multirama.gr	kotsovolos.gr	you.gr
Navigation	X				X
Product description		X		X	
Product categories and search filters		X			X
Customer support		X			X
Registration		X	X	X	X
Management account	X				
Checkout	X				X
Search engine					
Delivery and return policies		X		X	X
Payment and security policy					

Hasil penelitian menunjukkan bahwa tingkat kegunaan dari kelima website adalah baik, tetapi perbaikan signifikan dapat dilakukan. Selain itu, masalah kegunaan yang disebabkan oleh desain yang buruk atau masalah prosedur kerja. Hasilnya, website yang paling bermanfaat adalah multirama.gr, sedangkan you.gr adalah yang paling bermasalah.

Penelitian ini bertujuan untuk menilai seberapa besar kaitan HCI dan usability testing terhadap efektifitas, efisiensi dan kepuasan pengguna web dalam perusahaan serta mencari kekurangan di dalam sistemnya dan memberikan desin alternative untuk perusahaan.

Pengukuran ketiga variable tersebut dievaluasi menggunakan 10 komponen utama dari sebuah website e-commerce, yaitu,

1. Struktur / navigasi
2. Informasi produk
3. Halaman kategori dan filternya
4. Supporting pelanggan
5. Mesin pencarian
6. Proses pendaftaran
7. Manajemen akun
8. Pembayaran dan kebijakan keamanan
9. Proses cekout dan keranjang belanja
10. Pengiriman dan kebijakan pengembalian produk

Evaluasi dikerjakan dengan menggunak metode ARUT (Asynchronous Remote Usability Testing) yang mana digunakan untuk mengevaluasi 4 komponen pertama, sedangkan sisanya dievaluasi menggunakan metode TAP (Thinking Aloud Protocol () sedangkan untuk mengukur usability, digunakan kuisoner.

Hasil dari penelitian ini mengungkapkan bahwa pada dsarnya website e-commerce yang diuji, ada pada level baik dalam hal usability, namun tetap membutuhkan perbaikan design. Penelitian ini menunjukna dengan detail pada bagian mana saja dari 10 komponen yang disebut diatas tadi untuk dilakukan perbaikan seperti misalnya pada tombol navigasi yang dapat diperbaiki dengan cara menggabungkan pilihan ke dalam tombol sort.

Kesimpuan dari kekurangan-kekurangan dalam web tersebut didapatkan dari hasil kuisoner yang disebar kepada pengguna web, sehingga menghasilkan data yang dapat diolah dan menjadi rujukan dan dasar dari penilaian aspek-aspek yang kurang disukai pengguna. Interaksi manusia dengan computer dan kegunaannya diukur secara terus menerus agar mendapatkan hasil yang maksimal dalm pengembangan system ke depan.

Tugas 09

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Tugas
Membuat ringakasa dari jurnal :
Human-computer interaction and usability testing: application adoption on B2C Web sites

Jawaban
Pada Jurnal tersebut meneliti mengenai issue yang berhubungan dengan Human Computer interaction dan usability Engineering terhadap 5 website ecommerce B2C Yunani yaitu plaisio.gr, e-shop.gr, multirama.gr, kotsovolos.gr and you.gr.

Secara garis besar Penelitian tersebut dilakukan dengan mengukur keeffektifan, effesiensi, dan kepuasan dengan tujuan untuk mengukur usability dari masing-masing website tersebut. selain itu dihasilkan juga saran terhadap masalah yang ditimbul yang berhasil diidentifikasi selama penelitian
Metode yang digunakan :

1. Asychronouse remote usability, (ARU)
2. Thinking Aload Protocol (TAP)
3. Usability quesioner

Partisipan yang terlibat meliputi:
Untuk implementasi ARUT, 120 peserta diundang. Dari 120 individu, 88 merespons positif, menghasilkan tingkat partisipasi 77,3%. Dari mereka yang akhirnya setuju untuk berpartisipasi dalam penelitian ini, 41 adalah laki-laki (46,6%) dan 47 adalah perempuan (53,4%). Berkenaan dengan tingkat pendidikan para peserta, 29 telah lulus dari sebuah lembaga teknologi, 37 memiliki gelar universitas, 19 telah memperoleh gelar Master atau PhD dan tiga menyatakan bahwa mereka memiliki tingkat pendidikan lain. Sehubungan dengan usia, 51 peserta (58%) berada di kelompok usia 18-27 sedangkan 37 peserta sisanya milik kelompok usia 28-47. Menurut data, yang diperoleh dari Pertanyaan 7 dari kuesioner, 29 (33,3%) peserta tidak berpengalaman dengan pembelian e-commerce, 36 (40,9%) menganggap diri mereka tidak berpengalaman atau berpengalaman, dan sisanya 23 (26,1%)) dapat dikategorikan sebagai pembeli elektronik berpengalaman. Juga, enam peserta lagi dilibatkan dalam implementasi TAP. Dalam sampel ini, ada 2 yang tidak berpengalaman, 2 berpengalaman dan yang lainnya berkata: Saya bukan ahli tetapi saya juga tidak terbiasa.

Hasil Penelitian
Secara umum, kelima rentang situs Web menunjukkan tingkat kegunaan yang baik. Ini berarti bahwa situs Web sepenuhnya operasional dan tidak akan mempengaruhi pengalaman pelanggan secara negatif. Namun demikian, perbaikan desain diperlukan. Lebih khusus lagi, dalam tugas navigasi, para peserta tidak menemukan navigasi di situs web plaisio.gr menjadi sulit, tetapi

mereka tidak dapat menemukan tombol sortir. Ini adalah masalah sederhana yang dapat diselesaikan dengan mengintegrasikan opsi ke dalam filter pencarian. Di situs web you.gr, label tautan yang serupa membingungkan para peserta yang mengakibatkan usaha yang sia-sia. Sederhana dan tidak terspesialisasi dan nama-nama serupa harus digunakan dalam label.
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Human-computer interaction and usability testing: application adoption on B2C Web sites

LITERATURE REVIEW

From the title of this article, it can be understood that the three main areas of concern of the specific project are HCI, usability engineering and e-commerce. The most commonly accepted definition of HCI has been given as: Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them [3], whereas the most common definition for usability has been given as: The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use [4].

If the first definition is observed for a while, the words design, evaluation and implementation are those that stand out and are the link between the two fields. More specifically, HCI provides the principles, guidelines and standards for the design and implementation of interactive systems, while the usability engineering offers all the methods, techniques and tools for the evaluation of interactive systems. When examining the second definition, the words: effectiveness, efficiency and satisfaction arise. These three words are the key features of evaluation and the measurement units of

usability (effectiveness + efficiency + satisfaction = usability). Therefore, any attempt to evaluate the usability of a product should be made according to at least these three parameters. It is certainly worth noting that in international research, other indicators for the measurement of usability have been identified and implemented. For example, Nielsen adds the learnability and memorability and few errors [5], while Hornbaek presents a large number of usability indicators and how they can be measured [6].

AIMS OF THE STUDY

1. To evaluate how usable (i.e. effectiveness, efficiency, satisfaction, etc) each site is for the consumers and to examine whether e-commerce applications are being developed according to the user-centred design.
2. To measure the success rate, average task times, error rate and abandon rate through alternatives usability evaluation methods in order to understand the user experience.

3. To study whether worldwide design principles and guidelines are being applied to Greek e-commerce sites and to make certain assumptions regarding the relation of e-commerce sites with usability.
4. To conclude which site is the most usable and whether this fact is reflected in sales.
5. To identify usability problems and make alternative design recommendations.

METHODOLOGY

The methods which were chosen for the evaluation of the e-commerce sites are: 1) Asynchronous Remote Usability Testing (ARUT); 2) Thinking Aloud Protocol (TAP); and 3) Usability questionnaire. In particular, for the implementation of ARUT, the on-line usability tool, Loop11, was used. For the TAP, the Camntasia Studio 7 was used, whereas the usability questionnaire chosen was SUS.

DISCUSSION

In general, all the five Web sites ranges demonstrated good levels of usability. This means that the Web sites are fully operational and will not affect the experience of customers negatively. Nevertheless, design improvements are necessary. More specifically, in the task on navigation, the participants did not find the navigation in the plaisio.gr Web site to be difficult, but they could not find the sort button. This is a simple problem that can be solved by integrating the option into the search filters. In the you.gr Web site, the similar link labels confused the participants resulting in wasted effort. Simple and not specialised and similar names should be used in the labels.

In the task product description, the e-shop.gr and kotsovolos.gr Web sites should place important information such as product warranty in a more obvious spot. In the task customer support the same problem was detected in the you.gr and e-shop.gr Web sites. The ways of communication were not concentrated in one link (e.g. contact us) and as a result the participants did not perceive that other means of communication were available.

In the task registration, problems arose due to either misleading messages about confirmation of registration or internal problems. The confirmation messages were not clear in describing whether activation via e-mail is mandatory and in the kotsovolos.gr Web site, while the system replied with a message of confirmation of registration, the participants could not login for about five minutes. In the checkout process, the problems that were identified have to do with the size and position of the buy button and add to basket button. The checkout processes in all

Web sites are properly structured and can be described as simple. In the task search engine the participants encountered several problems, mainly in the e-shop.gr, kotsovolos.gr and you.gr Web sites. In the first Web site the problem has to do with the presentation of results, while in the other two, there seems to be a major problem in the communication of the Web application with the database. Finally, in the task delivery and returns policy the problem is due to the fact that the information was not easily accessible. A distinctive example is you.gr, where no participant could find the returns policy.

CONCLUSION

In the project, emphasis was placed on active participation in the process of evaluation of the intended customers. Five Greek e-commerce Web sites belonging to a particular business sector were evaluated. Three different usability methods were applied through appropriate tools for data collection. The results showed that, generally, the level of usability of all five Web sites was good but significant improvements could be made. Also, usability problems were identified, which are due to either bad design decisions or internal procedure problems (e.g. server). By the results, the most usable Web site is multirama.gr, whereas you.gr is the one with the most problems. Finally, the negative results of e-shop.gr made an impression.

Human-computer interaction and usability testing: application adoption on B2C Web sites

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ABSTRACT: The following research investigates issues relating to the field of Human-Computer Interaction and Usability Engineering. The project was an examination of five Greek B2C e-commerce Web sites by using methods, such as asynchronous remote usability testing, thinking aloud protocol and usability questionnaires in combination. Also, measurements for effectiveness, efficiency and satisfaction were made with the aim to measure the usability of each Web site. Furthermore, any usability problems were identified and alternative design suggestions were made.

Keywords: Usability, e-commerce, human-computer interaction, remote usability testing, thinking aloud protocol

INTRODUCTION

During the 1980s, using computers required knowledge and experience. The interaction between user and computer was a technology available to only a few [1]. Nowadays, the interaction has been simplified dramatically and specialised knowledge or experience is no longer needed to run simple and everyday tasks. People have the ability to manage their personal lives, their jobs, their health, their education and entertainment through computing devices due to the fact that the devices and software have more user-friendly interfaces. What has contributed to this great progress? One of the biggest factors is the intensive research not only by large companies but also by universities in the field of Human-Computer Interaction (HCI) [2]. The user acquires a central role and the design and development of any technological product is made according to their needs and specifications.

Over the years and the development of the Web, the significance of proper interaction becomes even more important resulting in a high demand for specialised design guidelines, which will serve specific purposes for Web design. Media applications, e-learning applications, e-banking applications and e-commerce platforms seem to satisfy some common design principles, but the diversity of each application's purpose makes the creation of specialised guidelines mandatory by methods that can assess the final design result. In this project an emphasis will be given on the e-commerce sector and on the interaction of customers with Web sites of on-line retailers.

LITERATURE REVIEW

From the title of this article, it can be understood that the three main areas of concern of the specific project are HCI, usability engineering and e-commerce. The most commonly accepted definition of HCI has been given as: *Human- computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them* [3], whereas the most common definition for usability has been given as: *The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and*

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HCI: Principles, Guidelines and Standards

As aforementioned, the sector of HCI provides the principles, guidelines and standards for the design and implementation of interactive systems. The difference between these three categories is the level of detailed design analysis. The design principles are abstract and for this reason they can be applied to many kinds of interactive systems. On the other hand, the standards are very detailed and usually cover specific goals and objectives [1]. The most distinctive design principles are the ten usability heuristics of Nielsen, the eight golden rules of Shneiderman, the 16 design principles of interaction of Tognazzini, the six design principles of Norman and the seven design principles of Governor Technology for e-commerce [2][5][7-9].

Moreover, there is also a large number of catalogues with recommendations in design guidelines. One of the most popular is the one by Smith and Mosier. The catalogue contains 994 design guidelines and is considered to be the most comprehensive list of design guidelines for the design of user interface software (UI) today [10]. This catalogue could be used either in the stage of the collection of the design requirements or in the evaluation of an already implemented software. Another catalogue of design guidelines for the Web UI was created in 2003 (renewed in 2006) by the US Department of Health & Human Services (HHS). It contains 209 guidelines, 184 of which are design guidelines and the rest are guidelines, which are related to Web usability and user-centred design [11]. Furthermore, there is also the Nielsen et al. catalogue, which specialises in designing e-commerce Web sites. The catalogue contains 207 design guidelines and is divided into five units (search engine, category pages, product description, checkout and registration). Just as the Smith and Mosier catalogue, it could also be used either at the stage of the collection of the design requirements or in the evaluation of an already implemented software [12].

As far as the standards are concerned, the most representative ones are the ISO 9241:1992 (Ergonomics of human- system interaction), ISO 13407:1999 (Human-centred design process for interactive systems) and the relatively recent ISO 9241-151:2008 (Guidance on World Wide Web user interfaces) [13]. The ISO 9241 contains 17 parts of which part 11 is of particular interest because it contains the definition and characteristics of usability. The second standard, ISO 13407, approaches issues of usability with high-level perspective [14][15]. Its purpose is not to provide detailed design guidelines but to present a user-centred design process step by step. This process is going to ensure the design of a usable system, which is going to satisfy the needs and distinctiveness of the users. The third standard, ISO 9241-151 is the first standard which is mentioned only on Web usability and design Web UI. The aim of ISO 9241-151 was the production of a list of guidelines, which in combination with the HCD approach could ensure high usability to the design of Web UI. Again, the three standards above are only the more representative ones. An article by Bevan presents all relevant standards in HCI and usability [13].

Usability Engineering: Evaluation Methods

In general, the Usability Evaluation Methods (UEM) can be categorised as: 1) analytic methods (in the laboratory without the participation of users); 2) experimental methods (in the laboratory with the participation of users); and 3) inquiry methods (out of the laboratory but with the participation of users) [2].

One of the most widespread UEMs is Heuristic Evaluation (HE). In general terms, at least two evaluators inspect the system and based on the heuristics, try to evaluate the usability, allocating a grade for each heuristic, which represents their judgment for the UI. HE could be applied both in the first stages of the design and in completed UIs. Two of the most important factors, which are being investigated and evaluated are the overall design and the dialogue elements. It should be emphasised that in a HE, different experts could add more heuristics or use alternative criteria, attaching different significance to them, based on the distinctive characteristics of each UI [16].

Another common UEM is the Thinking Aloud Protocol (TAP). TAP takes place within a laboratory, with the participation of the intended users of UI, and not experts. Ericsson and Simon, the developers of the method, suggest that the evaluation should be carried out with the participation of at least 3-4 users and with the assistance of one evaluation coordinator. Regarding the evaluation procedure, it can be characterised as simple and fast. More specifically, the test coordinator describes the tasks which should be implemented to the users. The users, during the implementation of these tasks, make comments on each action that they execute. At the same time, the coordinator keeps notes of the users' comments and prompts them to keep talking and suggest alternative solutions based on their opinions and perceptions when they face up to difficulties. Moreover, during the evaluation session, every action and all the reactions of the users are recorded by the use of special monitoring software in the desktop, so that thereafter, the moderator could analyse and correlate the reactions with the actions which were carried out [17][18].

Furthermore, the usability questionnaires are well received as a method of assessment. One of the most popular is the System Usability Scale (SUS). SUS consists of 10 questions (5-point scale) and is a high reliable tool developed by John Brook [19]. According to the Bangor et al, one of the biggest advantages of SUS is the fact that it has broad application to different types of UIs. More specifically, the high adaptability of SUS has been proved in the study of Bangor et al, as they used this evaluation tool in 206 projects. They concluded that the coefficient alpha is 0.91, something which means that SUS is reliable in any type of UI [19]. Moreover, a specific way of calculating the total satisfaction score has been identified [20].

A relatively recent method, which exploits the technologies of the Internet, is the Remote Usability Testing (RUT). Ramli et al divide RUT into two categories: synchronous remote usability testing and asynchronous remote usability testing. In the first case, during the evaluation, the usability coordinator and the users communicate and cooperate at the same time via a Web application. The presence of both participants is necessary for the completion of the session. In the second case, only the participation of users is obligatory. The coordinator typically sends users a personal e-mail with the link to the evaluation tasks and the users are able to answer whenever they want to [21].

PURPOSE AND MOTIVATIONS OF THE STUDY

The aim of this project was to evaluate five Greek B2C e-commerce Web sites, which belong to the hardware/software and household appliances market. This sector was chosen due to the fact that it is characterised by high demand for on- line purchases from Greek e-consumers [22]. Also, the limited amount of research on evaluation methods was a major incentive for the project.

AIMS OF THE STUDY

1. To evaluate how usable (i.e. effectiveness, efficiency, satisfaction, etc) each site is for the consumers and to examine whether e-commerce applications are being developed according to the user-centred design.
2. To measure the success rate, average task times, error rate and abandon rate through alternatives usability evaluation methods in order to understand the user experience.
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METHODOLOGY

Methods and Tools

The methods which were chosen for the evaluation of the e-commerce sites are: 1) Asynchronous Remote Usability Testing (ARUT); 2) Thinking Aloud Protocol (TAP); and 3) Usability questionnaire. In particular, for the implementation of ARUT, the on-line usability tool, Loop11, was used. For the TAP, the Camntasia Studio 7 was used, whereas the usability questionnaire chosen was SUS.

Evaluated Web Sites

The Web sites that were evaluated are plaisio.gr, e-shop.gr, multirama.gr, kotsovolos.gr and you.gr. All five Web sites belong to the hardware/software and household appliances business markets and were chosen based on the number of visits to them.

Participants

For the implementation of ARUT, the 120 participants were invited. Of the 120 individuals, 88 responded positively, producing a participation rate of 77.3%. Of those who finally agreed to participate in the study, 41 were men (46.6%) and 47 were women (53.4%). In regard to the level of education of the participants, 29 had graduated from a technological institute, 37 had a university degree, 19 had obtained either a Master's degree or a PhD and three stated that they had other levels of education. In relation to age, 51 participants (58%) were in the age group 18-27 while the remaining 37 participants belonged to the age group 28-47. According to the data, which were obtained from Question 7 of the questionnaire, 29 (33.3%) participants were inexperienced with e-commerce purchases, 36 (40.9%) considered themselves to be neither inexperienced nor experienced, and the remaining 23 (26.1%) could be characterised as experienced e-buyers. Also, six more participants were included in the implementation of TAP. In this sample, there were 2 inexperienced, 2 experienced and the others said: *I am not an expert but neither am I unfamiliar*.

Task
s

The five Web sites were evaluated in regard to the 10 most important components of an e-commerce site:
1) structure/navigation; 2) product's information; 3) category pages and search filters; 4) customers' support;

5) search engine; 6) registration process; 7) management account; 8) checkout process (shopping cart); 9) payment and security policies; and 10) delivery and returns policies. The first four components were evaluated through ARUT and the six remaining with TAP [5][9][20].

Tasks' Scenarios and Typical Evaluation Process

Initially, it should be stressed that each of the tasks given had different purposes and evaluation goals. For example, in order to evaluate the five Web sites' structure/navigation, the participants were asked to find a specific product (different products and hypothetical scenarios were given for each Web site). The purpose was to understand the navigation behaviour of the users and the goal was that the participants find the requested product. For instance, from the plaisio.gr Web site, they were asked to find the most recently added mp3/mp4 player, while from multirama.gr Web site, the participants were asked to find the least expensive Micro Hi-Fi system. It should be noted that the participants started their tasks from the home page of each e-commerce Web site. Figure 1 illustrates the process of the steps, which were necessary for the participants in order to complete the evaluation process.

Table 1: Typical evaluation process.

Step 1: Introductory text
Step 2: The participants answer questions 1-9
Step 3: Execution of the tasks for plaisio.gr
Step 4: The participants answer the questions of SUS (10-19) for plaisio.gr
Step 5: Execution of the tasks for e-shop.gr
Step 6: The participants answer the questions of SUS (10-19) for e-shop.gr
Step 7: Execution of the tasks for multirama.gr
Step 8: The participants answer the questions of SUS (10-19) for multirama.gr
Step 9: Execution of the tasks for kotsovolos.gr
Step 10: The participants answer the questions of SUS (10-19) for kotsovolos.gr
Step 11: Execution of the tasks for you.gr kotsovolos.gr
Step 12: The participants answer the questions of SUS (10-19) for you.gr
Step 13: The participants answer the question 20

Tasks Indicators

The following indicators were established in order to measure each task (Table 2).

Table 2: Indicators for each task.

Tasks	Effectiveness				Efficiency					Satisfaction		
	Success rate	Failure rate	Abandon	User errors	Task	Number of requests for help	Success rate in	Failure rate in a given	Mental	Positive comments	Negative comments	Proportion of negative and positive
Task 1: Structure/navigation	X	X	X		X	X				X	X	X
Task 2: Product information	X	X	X				X	X		X	X	X
Task 3: Category pages and search filter	X	X	X		X	X				X	X	X
Task 4: Customer support	X	X	X		X				X	X	X	X
Task 5: Registration Process	X	X	X	X	X	X			X	X	X	X
Task 6: Account management	X	X	X	X	X	X			X	X	X	X
Task 7: Payment and security	X	X	X		X	X	X	X		X	X	X
Task 8: Delivery and returns	X	X	X		X	X	X	X		X	X	X
Task 9: Checkout process	X	X	X		X	X	X	X		X	X	X
Task 10: Search engine	X	X	X		X	X				X	X	X

Results and Analysis

As can easily be understood from Table 3 that e-shop.gr had the highest completion rate for Task 1, which was rated at
23%, compared with lower ratings for the other Web sites. This means that the participants were able to navigate the e-shop.gr Web site more easily than the other Web sites. In Task 2 (Table 3), you.gr rated 26.67% and, therefore, had the most effective product description (that is, the structure of description, the hierarchy of information and the presentation of the product further facilitated the participants to find the information they were asked).

The plaisio.gr Web site had the best product classification but also more helpful search filters so that users were able to limit their search based on the criteria they wish (26%), followed by kotsovolos.gr (25.65%). Also, from Table 3, it seems that the kotsovolos.gr Web site allowed the participants to contact the representatives of the company more easily compared with the other Web sites, whereas in Task 5 (Table 3), all five Web sites received 20% because all the participants successfully completed the registration process for all Web sites. The same occurred in Task 6 as well. The participants had no problems modifying their personal data. Also, all five Web sites have very good completion rates in the checkout process. If one had to distinguish one of them from the others, plaisio.gr offers the most convenient checkout process (22%). At the same time, from Table 3, it seems that multirama.gr and plaisio.gr have the most functional and useful search engines (25% and 24% respectively).

What is worth noting from Task 9 in Table 3 is the rating of 0% received by you.gr. The 0% occurred because none of the participants was able to find the returns policy. Furthermore, the 36.35% received by the kotsovolos.gr Web site shows that the information about delivery and returns was easily accessible, but also that they were understood by the participants. In Task 10 (Table 3), similar rates of success were achieved for all the Web sites except for plaisio.gr, for which the low percentage presented caused concern.

Table 3: Distribution of results.

	plaisio.gr	e-	multirama.g	kotsovolos.g	you.gr
T1: Structure/navigation	17,60%	23%	19,40%	21%	18,80%
T2: Product description	21%	16,23%	21,76%	13,68%	26,67%
T3: Product categories and search filters	26%	14,88%	24,17%	25,65%	9,30%
T4: Customer support	20,97%	15,27%	23,28%	25,24%	14,42%
T5: Registration	20%	20%	20%	20%	20%
T6: Management account	20%	20%	20%	20%	20%
T7: Checkout	22%	21%	19%	19%	19%
T8: Search engine	24%	19%	25%	19%	13%
T9: Delivery and return policy	27,25%	18,20%	18,20%	36,35%	0%
T10: Payment and security policy	0%	23,53%	23,53%	17,64%	23,53%

In Table 4, the total measurements for all the tasks completed on the effectiveness, efficiency and satisfaction are shown. Although at this level the authors cannot conclude with accuracy which Web site is more usable, the one which seems to stand out is multirama.gr.

Table 4: Usability metrics comparison.

Web sites	Effectiveness (%)	Efficiency (secs)	Satisfaction (%)
plaisio.gr	73.2	1.289	58.45
e-shop.gr	67.6	1.438	58.17
multirama.gr	74.6	1.499	61.60
kotsovolos.gr	74.1	1.456	57.23
you.gr	61.2	1.423	50.32

Table 5: Usability problems which identified.

Tasks	plaisio.gr	e-shop.gr	multirama.gr	kotsovolos.gr	you.gr
Navigation	X				X
Product description		X		X	
Product categories and search		X			X
Customer support		X			X
Registration		X	X	X	X
Management account	X				
Checkout	X				X
Search engine					
Delivery and return policies		X		X	X
Payment and security policy					

The next one is plaisio.gr, but with little difference from kotsovolos.gr. On the other hand, you.gr seems to have the most usability problems, while the measurements of e-shop.gr would also be the cause of concern. E-shop.gr is considered dominant in this e-commerce sector and the rates it gets do not represent the power of the company. The above finding seems to be the same as the one in Table 5, where the usability problems identified during the evaluation were presented. Indeed, you.gr has the most problems of interaction, whereas multirama.gr the least.

DISCUSSION

In general, all the five Web sites ranges demonstrated good levels of usability. This means that the Web sites are fully operational and will not affect the experience of customers negatively. Nevertheless, design improvements are necessary. More specifically, in the task on navigation, the participants did not find the navigation in the plaisio.gr Web site to be difficult, but they could not find the sort button. This is a simple problem that can be solved by integrating the option into the search filters. In the you.gr Web site, the similar link labels confused the participants resulting in wasted effort. Simple and not specialised and similar names should be used in the labels.

In the task ***product description***, the e-shop.gr and kotsovolos.gr Web sites should place important information such as product warranty in a more obvious spot. In the task ***customer support*** the same problem was detected in the you.gr and e-shop.gr Web sites. The ways of communication were not concentrated in one link (e.g. contact us) and as a result the participants did not perceive that other means of communication were available.

In the task ***registration***, problems arose due to either misleading messages about confirmation of registration or internal problems. The confirmation messages were not clear in describing whether activation via e-mail is mandatory and in the kotsovolos.gr Web site, while the system replied with a message of confirmation of registration, the participants could not login for about five minutes. In the checkout process, the problems that were identified have to do with the size and position of the ***buy button*** and ***add to basket button***. The checkout processes in all Web sites are properly structured and can be described as simple. In the task ***search engine*** the participants encountered several problems, mainly in the e-shop.gr, kotsovolos.gr and you.gr Web sites. In the first Web site the problem has to do with the presentation of results, while in the other two, there seems to be a major problem in the communication of the Web application with the database. Finally, in the task ***delivery and returns policy*** the problem is due to the fact that the information was not easily accessible. A distinctive example is you.gr, where no participant could find the returns policy.

FUTURE WORK

A more thorough study of the components in which the most problems were identified is suggested. For example, in the search engines other methods of assessment should be used, but with participants who are experts in the field of Web development in order to identify more advance operating problems. A detailed study on the efficiency of Web applications and a segregation of the response time of each system is also suggested.

CONCLUSION

In the project, emphasis was placed on active participation in the process of evaluation of the intended customers. Five Greek e-commerce Web sites belonging to a particular business sector were evaluated. Three different usability methods were applied through appropriate tools for data collection. The results showed that, generally, the level of usability of all five Web sites was good but significant improvements could be made. Also, usability problems were identified, which are due to either bad design decisions or internal procedure problems (e.g. server). By the results, the most usable Web site is multirama.gr, whereas you.gr is the one with the most problems. Finally, the negative results of e-shop.gr made an impression.

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