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Article

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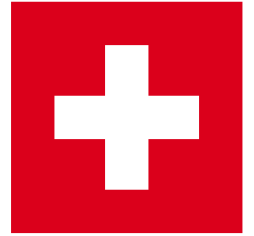
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The Silent Surfer: Experimentally manipulated live web content to study consumer behaviour

This article describes an A/B testing tool (i.e., Silent Surfer) that enables the use of live web content within experiments. Integrating e-mail, information pages, web experiment artefacts, and a concluding online survey into one seamless process reduces the time and costs required to conduct A/B testing, while leaving production environments un-touched.

Dr. Roger Seiler, Dr. Linda Miesler, Prof. Dr. Jürg Hari

In everyday business life, decisions on complex questions are omnipresent. Deciding which marketing campaign to launch or which online store design works best is usually tricky. Business decision-makers, managers, and consultants often rely on their intuition and experience (Bonabeau 2003, p. 2), typically arguing: “that has always worked” or “I know what customers want”. Intuitive decisions work well in certain cases, such as that of taxi drivers who have to judge the risk of encountering trouble with a customer based on physical impressions (Henslin 1968). However, in the rapidly changing environment of modern business, relying on previous experience may not be the best choice because conditions that fundamentally affect the decision may have changed, rendering past experience less useful, or even useless.

Experimentation is a method that helps to make decisions systematically on difficult questions or matters for which there is no previous experience. The basic idea behind the method of experimentation may be described using an example.

There is a coffee machine in the recreation room of an office building, and everyone is expected to pay for each cup of coffee dispensed by putting money into a piggy bank nearby. However, the number of dispensed coffees is higher than the corresponding amount in the piggy bank. In a study, Bateson et al. (2006) wanted to determine whether perceived social presence and control could help to increase the number of people who paid for their coffees. Therefore, a poster showing eyes staring into the room was placed above the coffee machine. For that week, the amount in the piggy bank was much higher. Then the poster was replaced by one showing a sunflower.

For that week, the amount paid nearly dropped back to the value without a poster. Therefore, putting up a poster with eyes staring into the room increased the amount paid for coffee. The poster with eyes created a subconscious illusion of being watched, and this created social pressure for people to make the requested contribution (paying for coffee).

This study transfers the same example to the online world by putting a banner on a charity donation website with eyes staring at the visitors (see condition “direct”, Figure 3), and comparing this with a banner where the eyes are not staring at the visitors (see condition “indirect”, Figure 3) and finally with an empty banner (see condition “control”, Figure 3) that matches the web-site’s background. By comparing the amounts donated to each group using the Silent Surfer, one can determine which banner is most effective. Typically – and mainly depending on the complexity of the experiment – this type of experiment can be set up and conducted by using the Silent Surfer tool within a few days. In simple experiments, a couple of hours are sufficient. This is largely due to the fact that existing web content is used, which eliminates the necessity of specially developing, building, or coding a web-site for an experiment.

As is standard in controlled experiments, participants are split into groups randomly, which is relevant for later statistical analysis. Each group sees exactly one banner: eyes directly (treatment group 1), eyes indirectly (treatment group 2), or empty banner (control group). The amounts donated by each group can then be compared using methods of statistical analysis – t-test or analysis of variance (metrical) or chi-square (non-metrical) – to test for significant differences between these groups. If a significant difference

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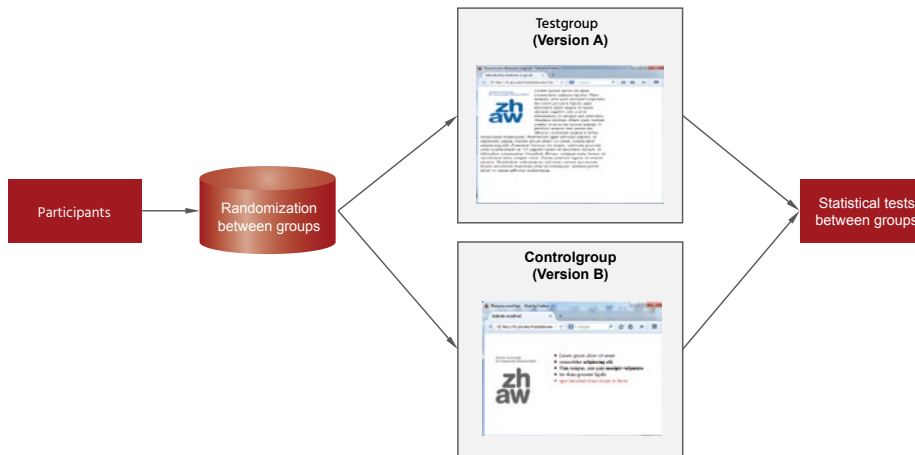
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Figure 1: A/B testing

Source: Seiler/Miesler/Hari, 2016.

is found between the groups, especially between a treatment group and the control group, it can be concluded, based on the ceteris paribus assumption, that the banner in the treatment group had a significant causal effect on the amount people donated.

Within the aforementioned experimental method, a number of further variations can be discerned. If experiments are conducted in the field with real cus-

tomers, they are called field experiments. An example of this method is randomly splitting traffic on a website into two groups and then showing each group a different website and finally comparing, for example, conversions rates, between the groups. If an experiment takes place in a laboratory setting (e.g., using students instead of real customers), the experiment is called a lab experiment. In contrast to the field experiment, the lab version requires the participant's consent. The application of experimental testing of two types of online pages and testing for statistically significant differences between these groups is called A/B testing (see Figure 1).

Compared to other research methods, A/B testing offers a number of advantages. Web experiments – in particular online field experiments – can yield large sample sizes (Birnbaum 2004) and thus potentially lead to high statistical power (see Kohavi/Henne 2007, p. 963 for a detailed look into an extension of statistical power to the domain of web experiments). In addition to yielding large sample sizes, high levels of realism can also be achieved with web experiments (Davis et al. 2013). The real con-

text aspect (the internet is much the same for a lab and the field) is key because it can contribute to high external validity (Agrawal et al. 2004, p. 672), which means that implications from these lab experiments are generalisable to other situations in the field.

This method is not limited to technical questions, such as the layout of an online store; it can test for impacts on various online business key performance indicators (KPIs), such as purchase rates, customer value, -satisfaction, -loyalty, checkout abortion rates, cross-/upselling behaviour, and bundle purchases. The value of this method lies in increased decision quality and in providing answers to the above-mentioned questions. Last but not least, using and conducting experiments allows researchers and practitioners to account for changing business conditions.

An overview of A/B testing software

Web experiments are widely used in social as well as behavioural sciences, such as psychology (Kraut et al. 2004; Reips 2002, p. 244). Some researchers build their own Social Lab software (Garaizar/Reips 2013), and others argue that major scientific advances are to be expected using online laboratories and experiments (Horton et al. 2011, p. 424). This shows the importance and attention currently being given to web experiments.

A variety of software solutions to conduct web experiments already exists, and a non-exhaustive overview of tools for practitioners and scientists is given in Table 1. A/B testing software, which is commercially available, usually has a user-friendly interface. Examples of such tools are Optimizely (Optimizely, 2013) and the Visual Website Optimizer (Chopra/Gupta 2013). Google Analytics provides a function

Management Summary

The Silent Surfer tool provides A/B testing functionality in one seamless process starting with the participant invitation and ending with an online survey.

As the Silent Surfer can use existing web content, a high level of realism is achieved while simultaneously reducing the cost of conducting experiments.

The tool presented in this contribution enables fact-based decisions regarding marketing actions in online environments, taking the context of these environments into consideration whilst optimizing such actions.

for A/B-testing (Wisniewski 2011, p. 55) for websites as well. In contrast to these practitioners' tools, researchers have created tools that help to build and conduct web and online experiments with a focus on specific research topic needs. Some authors distinguish between web and online experiments, permitting online but not web experiments to have investigators present, but in this article the term 'web experiments' is used based on the use of live web content, with an awareness that an investigator may use this tool in a laboratory setting as well. Examples of such

specific research tools are WEXTOR (Reips/Neuhaus 2002), OpenSesame (Mathôt/Schreij/Theeuwes 2012), and the PsyToolkit (Stoet 2010). Some focus on the issue of distributing web experiments, such as Tatool (Bastian/Locher/Ruflin 2013). Other solutions come as an add-on to existing software, such as PEBL for MATLAB (Mueller 2010). Not only can the technology or domain play a role, but the users' devices for accessing the internet can also be identified as important. As tablets and smartphones have become increasingly common, an eye should be kept on the

development of hardware, as A/B testing websites on these devices become increasingly relevant.

After analysing existing literature, we identified a gap in the existing software products, which can be closed by our method. Web context plays an important role and many tools still lack the support of the near-real world with respect to web-realistic experiences. Unfortunately, other easy-to-set-up tools focus either on a specific topic (e.g., psychology, where millisecond precision is required [Stahl 2006]) or cannot provide web-context functionality. As

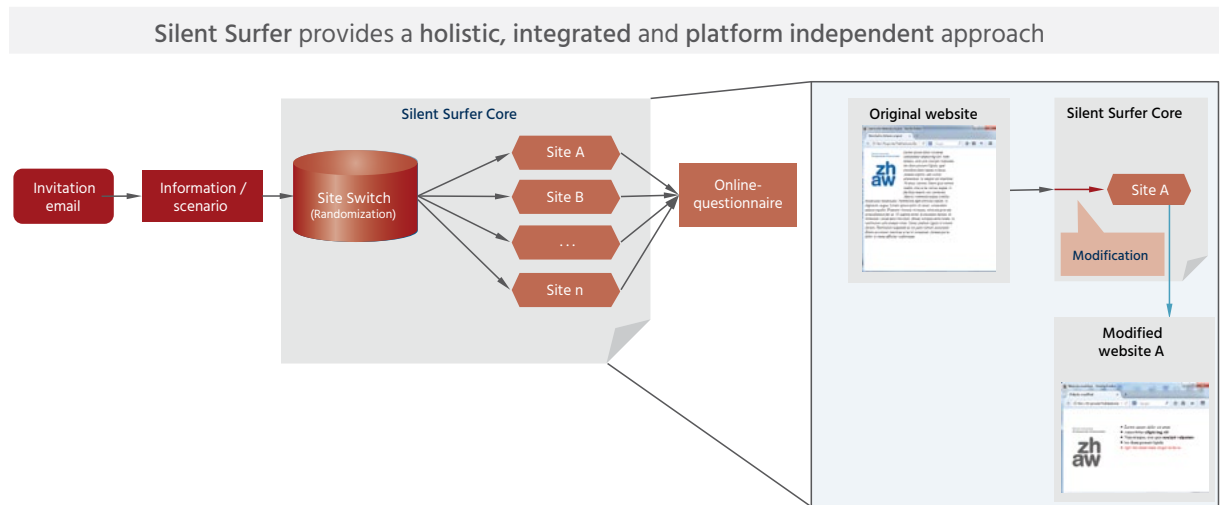
Table 1: Software overview

Program	Developer	Live Content ¹	Not Domain Specific ²	Integrated A/B- Testing	Realistic, Clickable Web Artefact
Silent Surfer	Seiler/Miesler/Hari (2014)	✓	✓	✓	✓
Adobe Target	Adobe	✗	✓	✗	✓
Axure	Axure	✗	✓	✗	✓
Balsamiq	Balsamiq Studios LLC	✗	✓	✗	✓
DEWEX	Naumann et al. (2007)	✗	✓	✓	✓
FactorWiz	Birnbaum (2000)	✗	✗	✗	✗
Optimizely	Optimizely (2013)	✗	✓	✗	✓
PEBL	Mueller (2010)	✗	✗	✗	✗
Social Lab	Garaizar/Reips (2013)	✗	✓	✗	✓
SurveyMonkey	SurveyMonkey	✗	✓	✗	✗
SurveyWiz	Birnbaum (2000)	✗	✓	✗	✗
Tatool	Von Bastian et al. (2013)	✗	✓	✓	✗
The Survey System	Creative Research Systems	✗	✓	✗	✗
VAS Generator	Reips/Funke (2008)	✗	✗	✗	✗
Visual Website Optimizer	Chopra/Gupta (2013)	✗	✓	✗	✓
WebExp	Keller et al. (1998)	✗	✓	✓	✓
WEXTOR	Reips/Neuhaus (2002)	✗	✗	✓	✓

¹Use of existing web content to build artefact for experiment. ²Use is limited to specific domain, e.g. the field of psychology.

³The whole process of conducting an experiment is supported by the software (from the invitation of participants to the online survey).

⁴The artefact used in the experiment behaves as realistically as possible like a real website. Source: Seiler/Miesler/Hari, 2016.

Figure 2: The Silent Surfer's components

Source: Seiler/Miesler/Hari, 2016.

the web is based on freely available technology, researchers, as well as practitioners, can build experiments that are intriguingly realistic using existing web content. We claim that building the artefacts (websites or prototypes for testing) from scratch is often not required, and therefore our method uses existing, live web content. Furthermore, many other scientific tools are system- or domain-specific, whereas the tool presented in this article is system-independent and does not require a software installation because it is web-based.

Current application of A/B testing by researchers and practitioners

The web provides an unprecedented opportunity to evaluate ideas quickly using web experiments (Kohavi/Henne 2007, p. 959). Following this line of thought, it is therefore no surprise that it is becoming increasingly common to conduct web experiments within the scientific community (Barchard/Williams 2008, p. 1111). Some authors ob-

serve that fact-based marketing is also being embraced by practitioners (Grover/Vriens 2006).

In the field of marketing research, the Silent Surfer can be used in the lab to conduct research on online advertising campaigns (e.g., A/B testing of different banners), pricing (e.g., increase current product prices for an online shop by 10%), conversion rates (e.g., Kohavi et al. 2008), influence of social media, click-through rates or shopping cart dropout rates (Kohavi/Longbotham 2010, p. 786).

Practitioners can use the Silent Surfer in the field, for example to test content on web portals or other sites they do not own. A company considering what content it should place on a portal can now apply the Silent Surfer method to the portal to test the content, using either real customers or participants from a panel selected by a market research company.

Corley et al. concluded that studies using a combination of lab and field experiments, observing, for example, purchasing behaviour, would be of particu-

lar interest to researchers and practitioners alike (Corley et al. 2013, p. 187) because both the scientific and practitioner's perspectives are taken into account and can be compared, potentially leading to deeper insights than an isolated approach. Furthermore, the advantages of both methods add to the quality of the results and the resulting decisions.

In line with this opinion, and especially in environments where online context is relevant, such as electronic customer relationship management (Hwang, 2009) or online advertising (Park et al. 2007), we argue that A/B testing proposes an interesting research method that is relevant and can be applied by practitioners, mainly because it can greatly reduce the costs, time, and inconvenience of conducting traditional experiments (Horton et al. 2011, p. 423).

The Silent Surfer's components

The Silent Surfer tool integrates five components (see Figure 2). The e-mail contains a link, which leads the participant to an instruction or information

page about the experiment. This page is optional, and in its absence it is replaced by instant redirection and randomisation. The instruction page contains different information depending on the experiment. For example, it might describe a specific scenario and give instructions to the participant. The experiment starts when the user clicks on a link below the instructional text and continues to one of the sites (A or B). Either time or a specific user behaviour, such as clicking on a buy button, leads the user to a concluding online questionnaire and the end of the experiment.

The core of the Silent Surfer lies in the modification of existing websites by fetching live web content and adding, removing or altering that content before sending it to the participant's browser (see the green square in Figure 2). Typically, text and images, as well as colours, can be changed to test for effects on a specific KPI, such as purchase behaviour. The Silent Surfer is built on open source software. Replacement, randomisation, and proxy functionality (fetching live content) are implemented using the webserver's built-in functionalities and libraries.

Last but not least, the Silent Surfer's advantage is that it can be used on websites that are out of the company's or researcher's control, such as social media,

online forums, online portals (e.g., comparis), or online stores (e.g., Amazon), where a company would like to test and optimise either testimonials or banner ads while simultaneously considering the context of these marketing actions.

The Silent Surfer's advantages

The Silent Surfer allows participants to surf the artefact (website) freely as the content is drawn from the web. Therefore, there is no restriction on the participant's surfing behaviour, although restrictions may be enforced if required

The use of existing content reduces costs, as no programming is required.

for methodological reasons. Furthermore, as the experiment runs in an online environment, the Silent Surfer logs the user's surfing behaviour. This behavioural data can then be cross-checked with the answers in the questionnaire and vice versa, increasing the quality and validity of results.

Because the Silent Surfer does not require changes to the production environment, projects can easily be carried out with fewer people than projects that require approval from the IT department for changes to the production environment.

A further advantage of the Silent Surfer is that, compared to existing web experiment software, it further reduces the effort and costs usually associated with the administration and initial setup of such web experiments because it uses live web content. The use of existing content reduces costs, as no programming is required. Another factor that reduces labour costs is the easy-to-use interface and the absence of programming skill requirements, which allows less skilled, and consequently less expensive, personnel to be used to set up experiments.

A/B testing is typically used to expose participants to two variants of an artefact: control (A) and treatment (B) (Kohavi/Longbotham 2010, p. 787). The Silent Surfer does not impose any limitation on the number of control and treatment groups used in an experiment, therefore extending the simple case of A/B testing to A-n-testing possibilities. Furthermore, these possibilities or variants can be quickly implemented by using existing web content.

In research experiments, participants are typically presented with a

Lessons learned

Use experiments to make decisions that are fact-based rather than relying on gut feeling or guesswork and by using customers as participants you gain a customer's point of view.

Use the power of experiments to find cause-and-effect relationships and use them for more effective and powerful marketing actions.

Use the Silent Surfer to take the real-life context into consideration by embedding online marketing experiments into a real-world context instead of using mockups.

Main Propositions

The use of existing web content to conduct A/B tests can reduce costs by reducing coding costs as well as allowing the use of less skilled, cheaper personnel without negatively impacting quality. By using an integrated process for A/B testing, the handling of A/B testing projects is simplified and generates advantages in cost as well as the possibility of cross-validation of data generated within the process.

As the Silent Surfer leaves IT systems untouched, A/B testing projects can be sped up.

Realistic online experiments can easily be implemented by using the Silent Surfer.

A/B testing – a step-by-step guide

1. Identify independent (input) and dependent (output) variables in a problem and generate a hypothesis with a causal relationship between the independent variable (e.g., the banner with eyes) and the dependent variable (e.g., the amount donated). See Section 1 for an example.
2. Make sure the cause-and-effect relationship (independent variable – dependent variable) is backed by business know-how or literature, because mere correlation does not imply a cause-and-effect relationship.
3. Clarify how the independent variable (IV) can be varied. Choose as simple a manipulation as possible. Do not vary too many factors at once, and be clear about the causal effect that is being studied.
4. Be clear about how the dependent variable (DV) will be measured (e.g., internal data from Customer Relationship Management (CRM)). The DV has to be observable and measurable (e.g., click rates or purchases).
5. Generate one version of the IV for each treatment group.
6. Hold all other variables constant (*ceteris paribus*) or control for them in the questionnaire (e.g., demographic variables).
7. Randomly assign participants to each of the groups. Each group should, as a rule of thumb, contain 30 or more participants.
8. Define a stopping criterion (e.g., number of participants reached or duration).
9. Measure the dependent variable in each group and calculate the mean of each group separately. Build subgroups within the control and treatment groups to examine the effects in more depth (e.g., male vs. female customers).
10. Test for statistically significant differences with the t-test (two groups) or ANOVA (multiple groups) between groups.

(Software: Microsoft Excel, IBM SPSS, KNIME, RapidMiner, R or PSPP).

scenario (e.g., the need to repurchase a product). However, companies may not want to let customers know that they are visiting a prepared or altered website, and therefore this component can be deactivated, leaving participants completely blind to the manipulation and giving the tool the name ‘Silent Surfer’. For an overview, as well as practical advice concerning the ethical aspect of such practices, see Barchand and Williams (2008).

Some tools are domain specific (see Section 2) and are, for example, limited to a specific field of research, such as psychology. We do not claim that the Silent Surfer applies to all research disciplines equally, but the tool is open to a wide range of research dis-

ciplines where research in the web environment is eligible and feasible.

Pitfalls

The generation of traffic on the original live website, where the content for the experiment is drawn by the Silent Surfer, can pose an issue. This issue can quickly turn into a real problem with dire consequences if a web experiment is conducted, for example, using an online shop, and high traffic may lead to security monitoring alerts. The issue can be solved by caching content (saving a local copy).

A similar effect can compromise the experimental setting and the *ceteris paribus* restraint if a live website changes while an experiment is in progress. This is an issue because it can

Literature

Adobe (2015): Adobe Target, <http://www.adobe.com/marketing-cloud/testing-targeting.html>, accessed 3 April 2015.

Agrawal, A. et al. (2004): Online marketing research, in: IBM Journal of Research and Development, 48, 4, pp. 671–677.

Anderson, E. T. (2011): A step-by-step guide to smart business experiments, in: Development and Learning in Organizations: An International Journal, 25, 6, pp. 98–105.

Axure (2015): Axure, <http://www.axure.com>, accessed: 12 February 2015.

Barchard, K./Williams, J. (2008): Practical advice for conducting ethical online experiments and questionnaires for United States psychologists, in: Behavior Research Methods, 40, 4, pp. 1111–1128.

Bateson, M./Nettle, D./Roberts, G. (2006): Cues of being watched enhance cooperation in a real-world setting, in: Biology Letters, 2, 3, pp. 412–414.

Birnbaum, M. H. (2000): SurveyWiz and factorWiz: JavaScript Web pages that make HTML forms for research on the Internet, in: Behavior Research Methods, Instruments, & Computers: A Journal of the Psychonomic Society Inc., 32, 2, pp. 339–346.

Birnbaum, M. H. (2004): Human research and data collection via the internet, in: Annual Review of Psychology, 55, pp. 803–832.

Bonabeau, E. (2003): Don’t trust your gut, in: Harvard Business Review, 81, 5, pp. 116–123.

Chopra, P./Gupta, S. (2013): Visual Website Optimizer Wingify, <http://visualwebsiteoptimizer.com>, accessed 2 April 2014.

Corley, J. K./Jourdan, Z./Ingram, W. R. (2013): Internet marketing: a content analysis of the research, in: Electronic Markets, 23, 3, pp. 177–204.

Davis, D. F. et al. (2013): Does marketing research suffer from methods myopia?, in: Journal of Business Research, 66, 9, pp. 1245–1250.

Garaizar, P./Reips, U.-D. (2013): Build your own social network laboratory with Social Lab: A tool for research in social media, in: Behavior Research Methods, pp. 430–438.

Grover, R./Vriens, M. (2006): The Handbook of Marketing Research, Thousand Oaks.

Henslin, J. (1968): Trust and the cab driver, in: M. Truzzi (Hrsg.): Sociology and Everyday Life, Englewood Cliffs (NJ), pp. 161–178.

Horton, J. J./Rand, D. G./Zeckhauser, R. J. (2011): The online laboratory: conducting experiments in a real labor market, in: Experimental Economics, 14, 3, pp. 399–425.

Hwang, Y. (2009): The impact of uncertainty avoidance, social norms and innovativeness on trust and ease of use in electronic customer relationship management in: Electronic Markets, 19, 2-3, pp. 89–98.

change the websites shown within the treatment or control groups. Both of these issues can be solved by caching content instead of fetching it live.

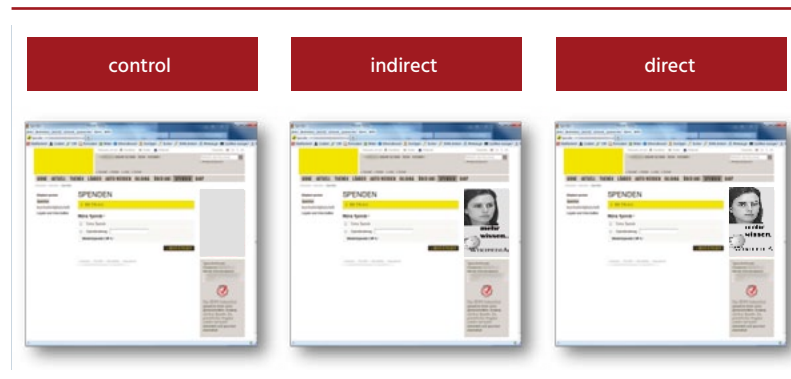
Last but not least are spillover effects, which occur when customers visit a website repeatedly (Anderson/Simester 2011). This issue can be handled by assigning a unique identifier that is rendered invalid after the completion of the experiment.

Summary

The Silent Surfer tool provides A/B testing functionality in one seamless process starting with the participant invitation and ending with an online survey.

As the Silent Surfer can use existing web content, a high level of realism is

Figure 2: The Silent Surfer's components



Source: Seiler/Miesler/Hari, 2016.

achieved while simultaneously reducing the cost of conducting experiments.

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Kahneman, D. (2011): *Thinking, fast and slow*, London and New York.

Keller, F. et al. (1998): *WebExp: A Java Toolbox for Web-Based Psychological Experiments-Users' Guide for WebExp 2.1.*, Technical Report HCRC/TR-99, Edinburgh.

Kohavi, R./Henne, R. M. (2007): *Practical Guide to Controlled Experiments on the Web: Listen to Your Customers not to the HiPPO*, in: *Proceedings of the 13th ACM SIGKDD international conference on Knowledge discovery and data mining*, pp. 959–967.

Kohavi, R./Longbotham, R. (2010): *Unexpected Results in Online Controlled Experiments* Microsoft, in: *SIGKDD Explorations*, 12, 2, pp. 31–35.

Kohavi, R. et al. (2008): *Controlled experiments on the web: survey and practical guide*, in: *Data Mining and Knowledge Discovery*, 18, 1, pp. 140–181.

Kraut, R. et al. (2004): *Psychological research online: report of Board of Scientific Affairs' Advisory Group on the Conduct of Research on the Internet*, in: *The American Psychologist*, 59, 2, pp. 105–117.

Mathôt, S./Schreij, D./Theeuwes, J. (2012): *OpenSesame: an open-source, graphical experiment builder for the social sciences*, *Behavior Research Methods*, 44, 2, pp. 314–324.

Mueller, S. T. (2010): *The PEBL Manual*, <http://pebl.sourceforge.net/peblmanual.pdf>, accessed: 04 August 2014.

Naumann, A./Brunstein, A./Krems, J. F. (2007): *DEWEX: a system for designing and conducting Web-based experiments*, in: *Behavior Research Methods*, 39, 2, pp. 248–258.

Optimizely. (2013): *Optimizely*, <https://www.optimizely.com/>, accessed: 14 May 2014.

Park, D.-H./Lee, J./Han, I. (2007): *The Effect of On-Line Consumer Reviews on Consumer Purchasing Intention: The Moderating Role*

of involvement, *International*, in: *Journal of Electronic Commerce*, 11, 4, pp. 125–148.

Perkmann, M./Walsh, K. (2007): *University–industry relationships and open innovation: Towards a research agenda*, in: *International Journal of Management Reviews*, 9, 4, pp. 259–280.

Plewa, C./Quester, P. (2007): *Key drivers of university–industry relationships: the role of organisational compatibility and personal experience*, in: *Journal of Services Marketing*, 21, 5, pp. 370–382.

Reips, U.-D. (2002): *Standards for Internet-Based Experimenting*, in: *Experimental Psychology (formerly Zeitschrift für Experimentelle Psychologie)*, 49, 4, pp. 243–256.

Reips, U.-D./Funke, F. (2008): *Interval-level measurement with visual analogue scales in Internet-based research: VAS Generator*, in: *Behavior Research Methods*, 40, 3, pp. 699–704.

Reips, U.-D./Neuhaus, C. (2002): *WEXTOR: a Web-based tool for generating and visualizing experimental designs and procedures*, in: *Behavior Research Methods, Instruments, & Computers: A Journal of the Psychonomic Society Inc*, 34, 2, pp. 234–40.

Saeed, K. A./Hwang, Y./Yi, M. Y. (2003): *Toward an Integrative Framework for Online Consumer Behavior Research: A Meta-Analysis Approach*, in: *Journal of End User Computing*, 15, 4, 1–26.

Seiler, R./Miesler, L./Hari, J. (2014): *Online web experiments using live web content*, in: *Academy of Marketing Conference*, Bournemouth.

Stahl, C. (2006): *Software for Generating Psychological Experiments*, in: *Experimental Psychology*, 53, 3, pp. 218–232.

Stoet, G. (2010): *PsyToolkit: a software package for programming psychological experiments using Linux*, in: *Behavior Research Methods*, 42, 4, pp. 1096–104.

Tomic, S. T./Peter, J. (2007): *Ensemble: A Web-based system for psychology*, in: *Behavior Research Methods*, 39, 3, pp. 635–650.

Von Bastian, C. C./Locher, A./Rufin, M. (2013): *Tatool: a Java-based open-source programming framework for psychological studies*, in: *Behavior Research Methods*, 45, 1, pp. 108–115.

Wisniewski, J. (2011): *Getting Started With Google Analytics*, in: *Online*, 35, 3, pp. 55–57.