Attributes of User Engagement for Website Development

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Abstract. Recently, many webpage development companies have invested a lot of time and money into the user experience research. Together with the whole information technology industry, webpage development is moving in the direction of creating easy and useful solutions for their target audiences. It is important to understand what makes an enjoyable user experience and engages users into using webpages. While user engagement has been recognized as an important issue by scientists and practitioners, still, a systematic review of different aspects of user engagement and corresponding user experience enhancement practices is not available. Therefore, the goal of this paper is to link findings of research in user engagement with the best practices and trends in the user experience design and website development; and to propose recommendations for developing engaging websites.

Keywords: User engagement · Flow theory · User experience · Website development

1 Introduction

Availability of the internet has spread fast around the world; prices of technologies to access the internet are falling down, which makes the World Wide Web (WWW) very crowded. Just the presence of the companies on the Internet is not enough anymore; users have to have a pleasant and enjoyable experience while visiting the websites of the enterprises. Otherwise the enterprises might loose their customers or miss the opportunities to acquire new customers via their websites. Recently, many webpage development companies have invested time and money into the user experience (UX) research; now it is common that even a small website development companies hire UX specialists. Together with the whole information technology (IT) industry, WWW is moving towards easy and useful solutions for target audiences. It is important to understand what makes an enjoyable UX and consequently engages users into using the webpages.

While user engagement has been recognized as an important issue by scientists and practitioners, still a systematic review of different aspects of user engagement and corresponding UX enhancement practices is not available. Therefore, the goal of this paper is to link findings of research in user engagement with the best practices and trends of a nowadays UX design and website development. To achieve this goal the following research activities were performed: (1) to review the literature on user engagement;

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(2) to reveal the most important attributes of user engagement; (3) to propose links between the attributes of user engagement and website development best practices; (4) to propose the recommendations for engaging website development on the basis of the discovered linkage; (5) to build a website for testing the applicability of the recommendations.

The paper is organized as follows: Sect. 2 introduces the related work on user engagement and amalgamates and presents the list of relevant engagement attributes. Section 3 proposes links between attributes of user engagement and website development best practices. In Sect. 4, the recommendations for developing websites, taking into account findings from previous sections, are proposed and briefly discussed. Conclusions are provided in Sect. 5.

2 Related Work on User Engagement

The goal of this section is to find common attributes and properties among several theories and models, which describe user engagement.

Majority of research papers on user engagement mention or use as the basis the "flow theory" by Mihaly Csikszentmihalyi. Other papers for review were selected by relevance to the goal of this paper and the popularity in the field, which was determined by the number of citations.

Regarding the flow theory, the term "flow" describing the human experience is first defined in 1975 by Mihaly Csikszentmihalyi [1]. He describes that "*in the flow state, action follows upon action according to an internal logic that seems to need no conscious intervention by the actor. He experiences it as a unified flowing from one moment to the next, in which he is in control of his actions and in which there is little distinction between self and environment, between stimulus and response, or between past, present, and future.*"

In flow state no goal is as important as the process, so even after a person has achieved the goal, s/he looks for the next one just to experience the flow again. However, the "*flow seems to occur only when tasks are within one's ability to perform. That is why one experiences flow most often in activities with clearly established rules for action.*" Having right amount of skills to perform particular activity is very important. With the lack of skills the anxiety increases, while being overqualified makes one bored. Research also states that the attention of the person has to be concentrated on a limited stimulus field, or in other words – consciousness has to be narrowed. In the flow state the person receives unambiguous feedback to her/his actions making her/him aware of how is s/he doing – good or bad. "*But in flow, one does not stop to evaluate the feedback; action and reaction have become so well practiced as to be automatic.*"

In 2004 M. Csikszentmihalyi in his TED Talk [2] summarized characteristics of the flow state in 7 items presented in the first column of Table 1: (1) completely involved in what we are doing – focused, concentrated; (2) a sense of ecstasy – of being outside everyday reality; (3) great inner clarity – knowing what needs to be done, and how well we are doing; (4) knowing that the activity is doable – that skills are adequate to the task; (5) a sense of serenity – no worries about oneself, and a feeling of growing beyond

the boundaries of the ego; (6) timelessness – thoroughly focused on the present, hours seem to pass by in minutes; and (7) intrinsic motivation – whatever produces flow becomes its own reward. A more detailed Flow model [2] was also provided, which shows a total of 8 states. *Apathy* being the opposite of the *flow* is a negative feeling, when there is no challenge and one does not need to use one's skills, it can be experienced, e.g., while watching TV. *Worry* is the state when the person feels that her skills might not be enough to finish the task, while *anxiety* state is when the person knows for sure that s/he is not capable of finishing the task, because either challenge is too high or qualification is too low. *Boredom* is the state when one is overqualified for the given task, *relaxation* is a more challenging state, but still not very exciting. Then come the 3 most positive states – *control*, *arousal,* and *flow*. In the *arousal* area, the person is over challenged, the skill set is not sufficient, but it is quite easy to get in the flow state by improving the skills; this is the area where most people learn as they have been pushed out of their comfort zone. In *control* area the challenges are not very exciting, so in order to enter the flow, the level of challenges has to be raised. *Flow state* is the balance between challenges and skills; in the web development context, challenges can be associated with the goals or tasks the person has when visiting the page; - these can be finding information, buying a product or service, or having fun. The skills required to do such tasks can be: information searching, form filling, and website browsing. The balance between challenges and skills has to be considered when designing websites. It can be expected, that designing the website with *Flow state* attributes in mind (Table 1), the visitors might be able to enter the *Flow state* and become engaged with the webpage.

Table 1. Engagement attributes

Flow theory	Website attributes and web performance	Aesthetic experience	User engagement with technology
Focused, concentrated A sense of ecstasy Great inner clarity Knowing that the activity is doable No worries about oneself Timelessness Intrinsic motivation	Control Attention Curiosity Intrinsic interest	Unity/Wholeness Focused attention Active discovery Affect Intrinsic gratification or felt freedom	Aesthetic and sensory appeal Attention Awareness Control Interactivity Novelty Challenge Feedback Interest Positive affect

In early days of the WWW websites mostly were designed for practical goals. The main purpose was to provide the information to users. Since that time a lot has changed and now web developers are looking for ways to create websites that are both utilitarian and hedonic [3]. Therefore, it is interesting what is the role of web attributes in user engagement, i.e., in what way they can influence the web performance and whether correct use of them can provide users with *experiential flow*. "*Attributes are features or aspects of a website. Users see each website as a bundle of attributes with varying capacities to satisfy their needs.*" Attributes can be classified as user-oriented and

technology-oriented; - the first ones are qualitative experiences of users, while the second ones are structural properties of the site. In [3], three main groups of website attributes were identified: complexity, novelty, and interactivity. *Complexity* is described as the amount of information provided by the website, if there is a vast amount of information, the website is considered complex. A good example of the complexity would be a website containing laws or standards with a large amount of text and paragraphs. *Novelty* can be novel experiences or information, or both at the same time. These are website elements that users find new, unexpected, or surprising. At some point these attributes become used to and are not novel any more, - a good example of such case is Google Maps. When they implemented Street View feature, it was something new and surprising, people used to browse the streets for no reason, just to see what the technology can do. *Interactivity* is an exchange of information between the user and the website. Interactivity is the main attribute, which distinguishes websites from other media types, although nowadays the smart TVs are providing similar features. Meaning of interactivity is further explained with following seven sub-attributes: Responsiveness - the ability of the website to provide the user with required information; Individualization - the ability of the website to provide the user with personalized information; Navigability - connectedness of the website, how well the information is connected among the parts of the website; Reciprocity - two-way information exchange between the user and the website; Synchronicity - the ability of website to provide real-time bidirectional feedback; Participation - the ability of the website to allow users create content; Demonstrability - the ability of the website to simulate or incorporate humanlike characteristics.

Huang [3] reduces *flow experience* to four main attributes (see Table 1): (1) Control, - sense of control over the website; (2) Attention, - how focused users are on the interaction; (3) Curiosity, - how aroused curiosity is during the interaction; and (4) Interest, - intrinsic interest in interaction of users. The author of [3] uses the concept of utilitarian and hedonic needs of users to better understand their experience. *Utilitarian* performance represents the practical goals of users, whether they have found what they looked for; *hedonic* web performance represents the emotional experiences when visiting the site, like amount of fun, pleasure, or playfulness. The model of how each of the attributes impact the UX is also proposed in [3]. The results of the research shows that complex sites are considered useful by users, but the main attribute that provides the hedonic and flow experience is interactivity. Novelty raises the flow experience, but undermines the hedonic performance.

Study [4] discusses the importance of fulfilling the customer needs to achieve business goals. Business processes must be aligned with the services provided by the website to create a good UX. It is important that business supports and responds promptly to user questions and feedback, as well as provides high quality services like fast shipping, easy refunding system and other services.

Theoretical background of *aesthetic experience* (AE) comes from centuries of philosophical discussions. The research in [5] studies both *flow experience* and *aesthetic experience* in the context of developing engaging and immersive websites. In their research the authors of [5] outline the main characteristics of AE (see also Table 1). *Unity/Wholeness* comes from the feeling of a high level of integration and coherence of all components related to the experience. *Focused attention* or *Object directedness* is

intense absorption in an activity where our attention is "undivided". *Active discovery* is *"the excitement of meeting a cognitive challenge"* and *"insight into connections and organizations – the elation that comes from the apparent opening up of intelligibility"*. *Affect* is the spice that flavours experience and keeps us coming back for more. "*Emotion carries the experience forward, binding parts and moments together*". *Intrinsic gratification* or *Felt freedom* is "*both a continuing enjoyment that is felt as part of the development of the experience and a final satisfaction or fulfilment that may linger after the experience has ended*". *Intrinsic gratification* does not need external rewards: the focus is on the process, rather than the ultimate arrival. The authors of [5] provide also a comparison between AE and *Flow Experience* (FE). Based on interviews with professional developers *Aesthetic framework* is proposed which provides sub-attributes for each of main AE attributes [5].

The process of engagement can be described in four stages: point of engagement, period of engagement, disengagement, and reengagement, according to [6]. For each stage several attributes, which promote or demote engagement, are defined (see the last column in Table 1).

Above we have reviewed several research papers on user engagement. They all use some common attributes for describing engagement as a phenomenon. Some researches, [1, 3, 5], describe the required conditions to have positive UX and become engaged in the action, others - [4, 6], describe the process or steps required to engage someone into the activity.

The flow theory has a simple concept that has been linked with engagement. It is a ratio between the challenges, which are created by the action, and the skills required to fulfil the task. When the ratio is optimal one enters the flow state, which is described by seven attributes. Other researches, [3, 5], are constructed on the basis of these attributes or have similar attributes without linking them to the flow theory. Only [4] is not concerned with the engagement attributes, it has a wider scope and looks at the steps that a customer has to take to become engaged in a product, a service, or a company, so in this section we will not use this source for identifying main attributes of user engagement.

In Table 1 all the attributes from researches [1, 3, 5, 6] are listed.

For structuring the further discussion in this paper, the attributes represented in Table 1 are grouped in five groups. The grouping is based on attribute semantic similarity and the first author's years of experience in website development. The following groups of attributes will be used in the remainder of the paper (each group includes also the attribute with the same name as the group, i.e., the groups are named by the key attribute): (1) **Interest** – Interest, Intrinsic interest, Curiosity, Intrinsic motivation; (2) **Challenge** – Challenge, Active Discovery, Knowing that the activity is doable, Intrinsic Gratification or Felt Freedom, Unity/Wholeness; (3) **Focus** – Focused, concentrated, Focused attention, Attention; (4) **Control** – Control, Great inner clarity, Interactivity, Feedback, Awareness; (5) **Affect** – A sense of ecstasy, No worries about oneself, Timelessness, Affect, Aesthetic and Sensory Appeal, Novelty, Positive Affect.

The order of the groups has been chosen to match the website development process, but some activities and tasks will be discussed not strictly following this sequence, because the design and development process is not a linear activity. Majority of the above

listed attributes are not technical ones. In the next sections we will link these attributes to practical and technical tools and methods to apply them to website development.

3 Mappings Between User Engagement Attributes and Possible Methods of Their Support

In the previous section we listed attributes of user engagement, which were found in four different research papers. In this section, for every group of attributes defined in Sect. 2, a way of how to apply them in the website development is proposed. In Figs. 1, 2, 3, 4 and 5 the attributes of each group are listed on the left side. The solutions that constitute the user engagement are on the right side. Based on the information sources indicated next to the solutions (in square brackets), the attributes are linked to certain solutions that are said to achieve engaging effects corresponding to these attributes.

In Fig. 1 the attributes of group Interest are shown.

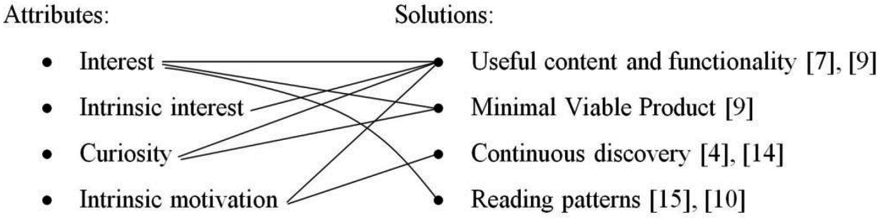

Fig. 1. Attributes of group Interest and corresponding solutions to meet them

In order to attract the interest of visitors, a website has to have a useful content or functionality. According to the article [7], "*Consumers are not interested in products and services. They are interested in problems and solutions.*" Today the central role of defining requirements and outcomes of the website is shifted towards users' feedback [8]. "*Ultimately, the success or failure of your product isn't the team's decision—it's the customers'. They will have to click that "Buy Now" button you designed. The sooner you give them a voice, the sooner you'll learn whether you've got an idea that's ready to be built.*" So getting out of the building or GOOB principle is proposed. It is based on the previous experience of requirements gathering process, where actual user needs will not be discovered sitting in the office and discussing them [9]. A website should not be developed for everybody, it is recommended to narrow the scope in the beginning, so that the website is targeted for a specific audience. When a solid amount of information about the users is gathered, customer personas (specific description of the customers) should be created [10, 11]. After the personas have been created, actions users take in order to accomplish their goals or tasks can be represented in user scenarios [10]. The user scenarios can be written in different forms – written narratives, visual storyboards, comic strips, or even videos [12]. Another method of representing scenarios is user scenario mapping – "*attempting to map out all the steps that a user will take to complete a task, with an initial focus on what your user will do, not necessarily how he or she will do it*" [12]. One more useful approach is so called *Minimum Viable Products*

(MVPs) [9]. It suggests to define the minimal functionality required to run the product, so it can be given to users as early as possible and learning process can start at the very early stage of software development. This greatly reduces "waste" – if the functionality or feature is not used or should be changed. It is easier to change or remove it in the early stages of development than after the website is fully finished and refined. Wire-framing and prototyping can be used to test ideas before any development is done to save time and resources [13]. To establish *continuous discovery process*, the feedback from the users has to be collected. The good example of determining the usefulness of the content is a small feedback form provided in online support of Microsoft or Pinterest approach to allow users to mark/report pins that users consider unhelpful or any other way inappropriate. To determine usefulness of the functionality, the analytics can be set up to track the user interactions with the elements of the website [14].

Reading patterns can be taken into consideration to organize the information according to reading habits, e.g., for more dense texts, F shaped pattern can be used [15] and for simpler texts – Z shaped pattern [10].

Thus, in order to attract user interest, the following activities are advised: find out user needs; provide useful content and functionality; start small and reach users early; put the most important content in the places where users look; use analytics to determine usefulness of content or functionality; continuously gather and apply user feedback.

Figure 2 reflects engagement attributes of group Challenge and the corresponding solutions to satisfy users with respect to these attributes.

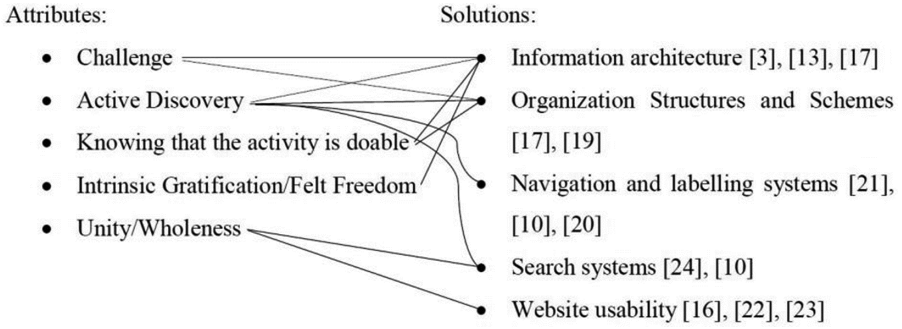

Fig. 2. Attributes of group Challenge and corresponding solutions to meet them

In Sect. 2 it was discussed that the challenge cannot be viewed separately from the skillset of the users. The websites with wide range of options might overwhelm visitors and make them feel that their skills are inadequate for challenges posed by the webpage [3]. Users get excited when they meet the cognitive challenge [5] and elation is felt when understanding how the website is structured. The website has to be developed in the way to give the visitors a clear way of discovering what they were looking for. This can be achieved with the help of *information architecture* [11] and by improving usability of the site [16]. The information architecture is defined as "*the structural design of an information space to facilitate task completion and intuitive access to content*" [13]. The information architecture for the WWW is concerned with the following main

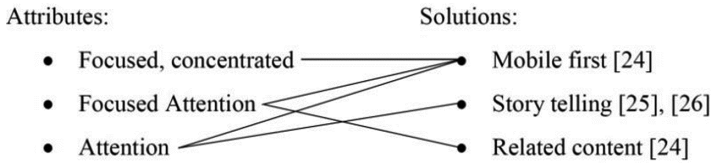

Fig. 3. Attributes of group Focus and corresponding solutions to meet them

systems [17]: (1) organization structures and schemes: how the information is structured and categorized; (2) labelling systems: how the information is presented; (3) navigation systems: how the information is browsed by the users; (3) search systems: how the users look for information. In order to design such systems, the connection among the Users (audience, tasks, needs, information-seeking, experience), Context (business goals, funding, politics, culture, technology, resources, constraints), and Content (content objectives, document and data types, volume, existing structure, governance, and ownership) has to be understood [17].

Every website has a message it wants to clearly deliver to its visitors. But it is not easy to *organize and structure* the information in the way that users will find it easy to browse and find what they need. The ways how visitors seek for information [18] should be taken into account. Card sorting [19] is suggested as one of the methods for seeking the right structure and organization of the text [19]. In a larger website it is challenging to come up with a good navigation system and labels for it. Navigation of the website can be designed by main navigation with submenus or main navigation with drop down menus, and navigation with or without breadcrumbs. There have been studies showing that users do not like drop down menus, even worse, they find them annoying [20]. It is also important to know how many items should be put in the navigation. There have been studies researching the optimal number of items in navigation and have come up with contradictory results [21]. The reason of such results was found to be the quality of labeling the navigation items. The results of the research showed that target content was found much faster with high quality link labels than those with poor quality, regardless of the structure of the navigation. It can be concluded that the proper labeling of items is more important than the number of items in the navigation menu. To keep users informed about their current place in the site, navigation item highlighting, breadcrumbs, and the use of consistent headings are recommended [10].

Search systems can help to achieve unity (wholeness) of the website. *Website usability* is described by several elements – consistency of the interface, response time, mapping and metaphors, interaction styles and multimedia and audio-visuals [22], or ease-of-navigation, speed, and interactivity [16, 23].

Thus, to balance the challenges with skills of visitors, the following activities are advised: design the website with consistency in core of it; structure and organize the information in understandable way for visitors; provide clear labeling for information and navigation; provide clear feedback of the user's current location; improve performance of the website.

The attributes of group Focus and solutions suggested for user satisfaction with respect to them are shown in Fig. 3.

The goal of this group of attributes is to keep users' focus on the website. This is not an easy task, because of so many distractions around us today – mobile phones, radios, TVs, etc. Above we have already discussed some approaches that help to keep the users focused, namely, the interests of users taken into consideration and provided meaningful structure to find what they need, and trying to focus their attention on the content or functionality they are interested in. *Mobile first* [24] website development has almost become standard for every developer in recent years. When development process is started from the smallest screen, careful consideration has to be made of what is the goal of the website and what is the most valuable content that a page has to provide to visitors. *Story telling* is another popular approach of attracting the attention of users and keeping them focused on the content the website is providing. According to several research papers [25], a reader or a listener experiences the same sensations as the main character of the story [26]. According to Harvard Business Review article [8], it was found that e-commerce customers became more engaged when a wider scope of information related to products were provided. This shows that customers are more dedicated to buy products, when their imagination has created feelings or experiences from information and stories. Story telling then can also be linked to intrinsic motivation (group Interest) and intrinsic gratification (group Challenge). When there are multiple similar choices and visitors have not decided what to do next or they want to see more of a content [24], *related content* can help to keep users engaged with the website.

Thus, for keeping users focused on a website, the following approaches are suggested: develop mobile first to discover the most important content; tell the story in the content to induce feeling in visitors; and provide related content to keep users focused.

In Fig. 4, the attributes of group Control are presented. In the simple websites users usually are in control, thus, the main focus there is on usefulness of the content. But in more complex websites, e.g., hotel or flight booking websites, it is important to consider solutions presented in Fig. 4. *Input fields* and forms are among the most complex elements for both, developers and users. Over the last few years, the analytics of the websites has improved significantly and a lot of examples of online form optimization have appeared on the web. One of the most prominent examples was the Expedia removal of one input filed in their booking form which resulted in an extra $12 million profit for the company [24].

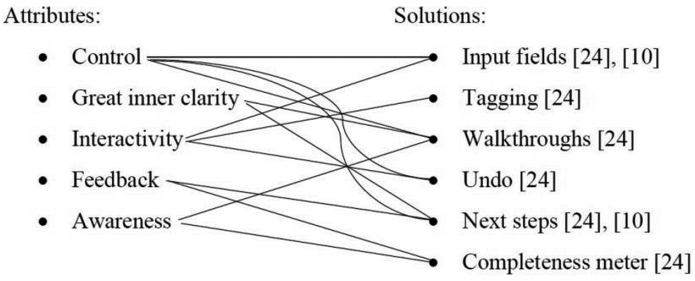

Fig. 4. Attributes of group Control and corresponding solutions to meet them

When a website has a large amount of data, *tagging* can help to organize the content in logical structures [24]. For complex websites like web applications that comprise many functions and features, *walkthroughs* are a very useful tool to give users the feeling of control. In a walkthrough it is possible to introduce users to the user interface, the basic usage and a workflow of the application, or some more advanced features that might be hidden in submenus. The possibility to *undo* also enables the users to feel as being in control [24]. Websites, that highly rely on user generated content and require the input from users, can apply thea list of *next steps* to take to finish an action or a task [10, 24]. This gives users a clear understanding of what to do next and makes them feel in control of the tasks. To give the user a feedback of the status of the task or activity a *completeness meter* is a good solution. It can show the completeness of the user's profile, asking her or him to add more information to reach the 100% in completeness meter. Also the multi-step forms are in use, where the user can see how many steps have been done and how many steps are still ahead [24].

Thus, for giving users a sense of control, the following activities are advised: simplify all inputs, provide tips or make them human language like; provide feedback when the user is filling forms or fulfilling the task; provide tips for next steps or actions; show the progress of the task.

In Fig. 5, the attributes and corresponding solutions of group Affect are shown.

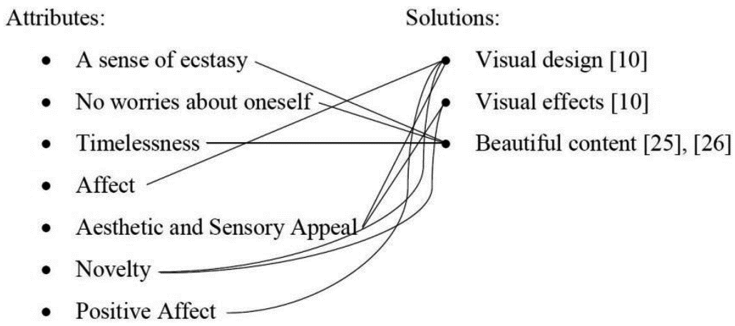

Fig. 5. Attributes of group Affect and corresponding solutions to meet them

The attributes of this group are rather subjective and the ways of achieving such properties will also be subjective. The goal is to be liked by the larger group of people. This can be achieved with a good *visual design* [10] and widely adopted and well know elements of the websites like navigation, media and inputs, which have been discussed in previous sections. Regarding *visual effects*, web technologies are progressing, equipping web developers with better and better tools, such as HTML5 and CSS3, that help making UX smoother. Aesthetically beautiful sites should not necessary have a beautiful design; they can even have a very ascetic design if the *content is beautiful*. Usually these are sites containing such artefacts as beautiful pictures, music, or videos.

Thus, to help to induce the positive affect, the following activities are suggested: use refined visual design; add visual effects to create sensation of continuity; use beautiful content and media to engage users.

4 Recommendations for Developing Engaging Websites

On the basis of information amalgamated in previous sections, the recommendations for designing engaging websites are proposed in this section. The purpose of the recommendations is to highlight, which engagement support methods have to be best considered at which functional areas of website development.

User research area. Websites should be designed for specific target audience and specific problem solving. To better understand the problem and how to solve it, the user research should be done. The following methods are recommended in this functional area of website development:

- *Define personas* [10, 11]. It is important to find the main customers first, – the people for whom the website will help to solve the problems. All the customers have some kind of problems, but not all problems or solutions have customers. Define several Personas and add good amount of details – age, gender, name, interests, to their description. Details will help to predict their problems and how to solve them. Visit and speak to people that are in the target audience, gather the data about them: what they like to do, what are their expectations. Then attach that data to Personas to make them conform to real life persons.
- *Write user scenarios* [10, 12]. Define realistic goals for Personas. Write the scenarios, where Personas try to resolve their problems with the help of the website. These can be written as steps required to achieve the goals of the customers. The scenarios will help to understand the structure of future website, as the steps will represent actions users have to take.
- *Test assumptions* [9]. When the target audience and their problems are defined, it is important to verify if they are true. This is again the time to go out and talk to people that match the target audience. The most difficult task in this activity is to know how to talk to the potential users. Questions have to be cleverly formulated otherwise interviews may lead to completely unusable data. It is because people are more optimistic and willing when there is no need for real action, but when they have to do it in real life, they are more reserved. Here are a few examples of how to talk to people: avoid asking if they would like to buy a product or service, but try to find out whether they use similar products or services; avoid asking if they have a specific kind of problems, but try to find out what they would do in the situation where the problem would occur; avoid giving them answer options to the question, let them give their own answers.

Feature selection area. When the target audience and their problems are researched, it is time to find the right solutions. Taking into account results from user research, the features of the website should be prioritized by the importance to the users. The following methods supporting user engagement are recommended for this functional area of website development:

- *Minimum Viable Product (MVP)* [9]. When defining MVP, it is important to understand what knowledge is to be learned. In most cases it is important to know is there

a need for a solution to be designed, is there a value in the solution, and will users will be able to use it. After answering these questions respective features for MVP should be selected.

- *Select engaging features*. MVP is a good starting point, but alone will not provide engaging experience for website users. In Sect. 3 engaging attributes and activities to implement them in website development were described in detail. Here a summarized list of activities that help making website engaging is provided:
  - Put the most important content in the places where users look [10, 15]
  - Use analytics to determine usefulness of content or functionality [7, 14]
  - Provide easy means to submit feedback [14]
  - Design the website with consistency in core of it [16]
  - Structure and organize information in an understandable way for users [11]
  - Provide clear labelling for information and navigation [10, 21, 22]
  - Provide clear feedback of user's current location [24]
  - Improve performance of the website [23]
  - Develop mobile first to discover the most important content [24]
  - Use story telling in the content to induce feelings in visitors [25, 26]
  - Provide related content to keep users focused [24]
  - Simplify inputs, provide tips or make them human language like [10, 24]
  - Provide feedback when the user is filling forms or fulfilling a task [10, 24]
  - Provide tips for next steps or actions [10, 24]
  - Show the progress of the task [24]
  - Use refined visual design [10]
  - Add visual effects to create sensation of continuity [10]
  - Use beautiful content and media to engage users [25, 26].

Prototyping area. Prototyping [13] can save a lot of time in finding and testing the best solutions for user problems. There are several kinds of prototypes, each having advantages and disadvantages. The choice of the right kind of the prototype should be based on the available resources.

- *Low-Fidelity Prototypes.* These can be paper or digital prototypes. Paper prototypes are very easy to make, only basic skills are needed and it requires only paper, pencils or pens, and tape. This kind of prototyping allows easy collaboration among team members because everyone can participate and see the result. It is creative process and people, who spend the most of the time at computer screens, might enjoy spending time doing something non-digital.
- *Wireframes.* Wireframes are digital cousins of paper prototypes. Wireframes can be plain non-functional or with basic interactions (clickable). There are many tools that provide wireframe drawing, e.g., a well-known Microsoft Visio. This kind of prototype will give better insight on interactions with the website and the steps users will need to take to accomplish their goals.
- *Mid and High Fidelity Prototypes* [9]. Mid and high fidelity prototypes show a lot more resemblance to the final product, the level of detail for visual design; interactions and content design come close to the expected end result. For this kind of prototypes there are also several tools available, some provide lower other higher

level of interactivity, some tools have options for animations, transitions and other effects. Examples of such tools are inVision, Justinmind, and Moqups.

- *Coded prototypes* [9]. Coded prototypes offer the highest level of fidelity: people interacting with this kind of prototypes should not recognize that these are prototypes. These prototypes include all the elements of the final product – form fields, menus, buttons, and functions. The development of this kind of prototypes takes more time than all previously mentioned prototypes, but code from the prototype can later be used in production version of the website.

Ensuring high quality service across the whole organization area. It is not enough to provide *tools for giving the feedback* – contact form, online chat, and other tools. The organization has to have *the procedures how to process the information on feedbacks*, so the visitors get the feeling that their feedback matters. The same applies to other services like shipping goods or refunding money. If *organizational processes* do not support website functionality, it will not be possible to engage users [4].

Continuous improvement area. Even when a website is published, the work is not finished. There can be features that were not implemented, because they had low priority. Analytics might indicate weaknesses of the website. There can be many more reasons, why the website should be kept improved over the time. Not all websites generate enough income to be improved frequently; in these cases thorough analysis of analytical data from time to time and minor adjustments will be satisfactory. Improvements to published websites can be applied in the same way as described in above-discussed areas: by researching users and testing improvements before they are applied to the websites. At this point analytical data can help to find parts of the websites that should be improved. Such methods as *A/B testing* and *multivariate testing* can be used on published websites with real users to test new ideas or improvements.

Each functional area in the recommendations is related to at least one of the attributes discussed in the previous section. To test the recommendations, they were applied in the development of the website for water sports in Latvia. The developers perceived a bit unusually big effort required in the user research and feature selection. All four kinds of prototypes were developed and user feedback gathered using the interviewing technique. Also the expected procedures for ensuring high quality service across the whole organization and continuous improvement were envisioned. The perception was that, despite the application of the recommendations required more developer time, – the result was rewording, especially, when learning from user feedback that user engagement for the developed website was higher than for other thematically similar websites.

5 Conclusions

The purpose of this paper was to look closer to the attributes behind the user engagement which becomes one of the essential issues in information systems development. While there are many studies with respect to engagement, this paper fills the gap of the lack of their comprehensive survey. The survey is briefly represented in Sect. 2. Another contribution of the paper is mappings between the engagement attributes and different

approaches, methods and techniques that can be used to achieve user engagement. On the basis of these mappings, the practical recommendations for website development are proposed, which can be applied using the given mappings and suggestions in literature sources presented in the solution side of the mappings. The recommendations were tested by the real-life experiment.

The mappings presented in Sect. 3 can be useful not only for website development. They may refer to information systems development in general. However, it has to be emphasized that the paper was targeted to website development and the literature for analysis was selected in this context. Therefore, additional research is needed to fully generalize the mappings presented in Sect. 3. The recommendations proposed in Sect. 4 can be used as a guideline in website development. They do not provide a breakthrough approach, however, they show, in which functional areas of webpage development which engagement issues have to be considered; and emphasize that the engagement cannot happen without appropriate "background" activities and continuous improvement. These recommendations might also help to reduce development and support costs, increase sales, and reduce staff costs for employers [27].

While the mappings, which are the basic contribution of the paper, are rather clear and can be useful in website development, further research would be beneficial to see whether it is possible to reduce the slight attribute overlapping and the solution overlapping that currently bit hinder straight-forward (supplementing recommendations free) application of the mappings.

References

1. Csikszentmihalyi, M.: Beyond Boredom and Anxiety, 231 p. Jossey-Bass Publishers, San Francisco (1975)
2. Csikszentmihalyi, M.: TED Conferences, LLC, Flow, the secret to happiness (2004). http://www.ted.com/talks/mihaly_csikszentmihalyi_on_flow?language=en
3. Huang, M.-H.: Designing website attributes to induce experiential encounters. Comput. Hum. Behav. **19**(4), 425–442 (2003)
4. Sashi, C.M.: Customer engagement, buyer-seller relationships, and social media. Manag. Decis. **50**(2), 253–272 (2012)
5. Jennings, M.: Theory and models for creating engaging and immersive ecommerce websites. In: Proceedings of the ACM SIGCPR Conference, pp. 77–85 (2000)
6. O'Brien, H.L., Toms, E.G.: What is user engagement? A conceptual framework for defining user engagement with technology. J. Am. Soc. Inf. Sci. Technol. **59**(6), 938–955 (2008)
7. UX Booth, Content Marketing: You're Doing it Wrong (2014). http://www.uxbooth.com/articles/content-marketing-youre-wrong/
8. Eisingerich, A.B., Kretschmer, T.: In e-commerce, more is more. Harvard Bus. Rev. **86**(3), 20–21 (2008)
9. Gothelf, J.: Lean UX: Applying Lean Principles to Improve User Experience, 152 p. O'Reilly Media, Sebastopol (2013)
10. Bank, C.: Web UI Design Best Practices. Web: UXPin, 109 p. (2014)
11. ConversionXL, Getting The Website Information Architecture Right: How to Structure Your Site for Optimal User Experiences (2013). http://conversionxl.com/website-information-architecture-optimal-user-experience/

12. UX for the masses, A step by step guide to scenario mapping (2010). http://www.uxforthemasses.com/scenario-mapping/
13. King, H.J., Jannik, C.M.: Redesigning for usability. Information architecture and usability testing for Georgia Tech Library's website. OCLC Syst. Serv. **21**(3), 235–243 (2005)
14. Kohavi, R., Henne, R.M., Sommerfield, D.: Practical guide to controlled experiments on the web: listen to your customers not to the hippo. In: Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, pp. 959–967 (2007)
15. Nielsen Norman Group, F-Shaped Pattern For Reading Web Content (2006). http://www.nngroup.com/articles/f-shaped-pattern-reading-web-content/
16. Wang, J., Senecal, S.: Measuring perceived website usability. J. Internet Commer. **6**(4), 97–112 (2008)
17. U.S. Department of Health & Human Services, Information Architecture Basics. http://www.usability.gov/what-and-why/information-architecture.html
18. Boxes and Arrows, Four Modes of Seeking Information and How to Design for Them (2006). http://boxesandarrows.com/four-modes-of-seeking-information-and-how-to-design-for-them/
19. Boxes and Arrows, Card sorting: a definitive guide (2004). http://boxesandarrows.com/card-sorting-a-definitive-guide/
20. KISSmetrics, Are You Making These Common Website Navigation Mistakes? (2013). https://blog.kissmetrics.com/common-website-navigation-mistakes/
21. Miller, C.S., Remington, R.W.: Modeling information navigation: implications for information architecture. Hum. Comput. Interact. **19**(3), 225–271 (2004)
22. Palmer, J.W.: Web site usability, design, and performance metrics. Inf. Syst. Res. **13**(2), 151–167 (2002)
23. Souders, S.: High Performance Web Sites: Essential Knowledge for Front-End Engineers, 170 p. O'Reilly Media, Sebastopol (2007)
24. Bank, C.: Web UI Design Patterns. Web: UXPin, 195 p. (2014)
25. The New York Times Company, The Neuroscience of Your Brain on Fiction (2012). http://www.nytimes.com/2012/03/18/opinion/sunday/the-neuroscience-of-your-brain-on-fiction.html
26. Maltz, M.: Psycho-Cybernetics: A New Way to Get More Living Out of Life, 288 p. Pocket Books, New York (1989)
27. Bias, R.G., Mayhew, D.J.: Cost-Justifying Usability: An Update for the Internet Age, 660 p. Morgan Kaufmann Publishers Inc., San Rafael (2005)