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Styling Influence to the Loyalty for Knowledge Sharing on WikID

Regine W. Vroom, Bart Bleijerveld, and Joost Schulze

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***Abstract*—**WikID is a wiki for industrial design engineers. An important aspect for the viability of a wiki is the loyalty of the user community to share their information and knowledge by adding this knowledge to the wiki. For the initiators of a wiki it is therefore important to use every aspect to stimulate the user community to actively participate. In this study the focus is on the styling of the website. The central question is: How could the WikID website be visually designed to achieve a user experience which will incite the user to actively participate in the WikID community? After a literature study on the influencing factors of a website, a new interface has been designed by applying the rules found, in order to expand this website's active user community. An online questionnaire regarding the old or the new website gave insights in the opinions of users. As expected, the new website was rated more positively than the old website. However, the differences are limited.

***Keywords*—**Industrial Design Engineering Knowledge, Wiki, Stimulate Knowledge Sharing, Influence of a wiki styling to the willingness of users to participate.

I. Introduction

A WIKI is a website that uses wiki software, allowing the easy creation and editing of any number of interlinked Web pages, using a simplified markup language or a WYSIWYG text editor, within the browser. Wikis are often used to create collaborative websites and to power community websites. The collaborative encyclopedia Wikipedia is one of the best-known wikis. [1]. In other words, a wiki makes it possible for people not only to search for information, but also to contribute to this information.

The big advantage of wiki's is the fact that anyone can easily contribute to the information offered. This however comes with a problem, because the accuracy of the information added is hard to check for factual consistency. Critics of Wikipedia for instance claim that the information on the website is unreliable and inaccurate. Other studies have shown that Wikipedia closely approaches the accuracy of the famous 'Encyclopedia Britannica'. [2]

WikID is a wiki based website, developed by the faculty of Industrial Design Engineering (IDE) of the Delft University of Technology (DUT). The aim of WikID is to offer brief and quick accessible information (rules of thumb), only about design related topics, for industrial design engineers worldwide. WikID is created with semantic media wiki and is supposed to become a design tool instead of an encyclopedia. The knowledge structure (taxonomy) in WikID is important to enable designers to browse through the collected knowledge and this way supporting and inspiring the designer to enrich the designs of products. This structure has been determined in previous studies [3], [4]. Three main entrance structures have been created: 1) Design theories; 2) Design aspects (e.g. product safety, material properties, production techniques, legislation, ergonomics, aesthetics, etc.) and 3) Product domains (i.e. information about product categories and environments, e.g. office, transport, medical, children, etc.) (See Fig. 1).

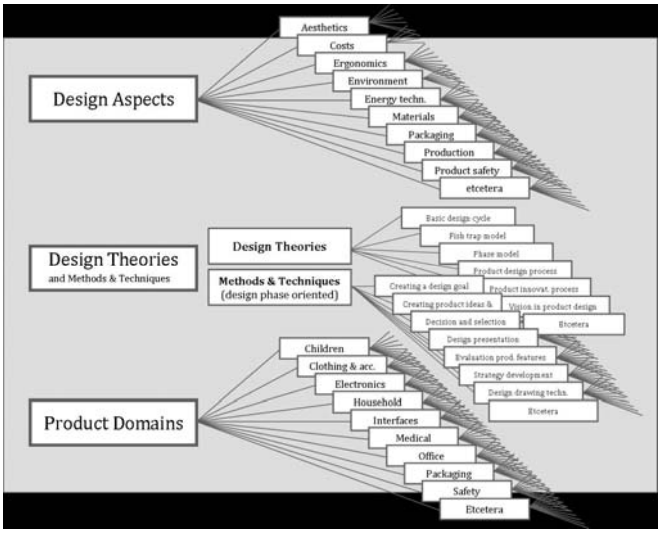


Fig. 1 The knowledge structure in WikID

An important aspect for the viability of a wiki is the loyalty of the user community to share their information and knowledge by adding this knowledge to the wiki [5]. For the initiators of a wiki it is important to utilize every aspect to stimulate the user community to actively participate. In this study the focus is on the styling of the website.

II. Research Question

Before becoming an active user, people have to visit and

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use the WikID website in the first place. The visual appearance plays an important role in the commitment and interest of a visitor to a certain website, and therefore will make it come back more often over time. The main research question is:

How could the WikID website be visually designed to achieve a user experience which will incite the user to actively participate in the WikID community?



Fig. 2 The Main Page at the beginning of this study

In order to achieve this user commitment, the relationships between the website's visual appearance and the emotions of a user have been studied [6], [7], [8]. The user should enjoy the WikID website, but not in a way which will distract him or her from reading and understanding the offered information. So, the WikID interface has to be functional and discrete but also pleasurable to see.

III. Design and Emotional Impact of Websites

The appeal of a website can be split up in two main categories, 'InSite' and 'OutSite factors' [9], [10], [11].

The environment, psychology and task factors related to the user are called the OutSite factors (outside the web site). The InSite factors (factors inside the web site that might influence the user's emotion) represent dynamical changes of the interface based on the principles of: graphic design, cinema emotional approaches and the theory of semiotics (see Fig. 3). For WikID the aim is to improve some of WikID's insite factors.

Primarily the factors regarding the design of the website are interesting for the study, specifically, the contours and layout, typography and color schemes. Navigation factors are out of the scope since wiki's have a general structure for navigation.

A. Lay out Design

The general layout of a website can be split up in several factors. The user's first impression is determined in 50 milliseconds [12]. In this extremely short period of time, the user won't be able to read any text whatsoever. The first impression will be determined by very basic design aspects, such as contour, contrast and symmetry.

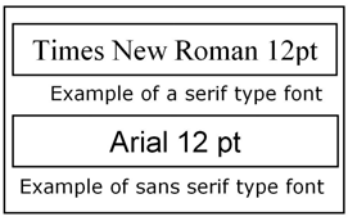
When a user visits a website, he has some expectations of what is probably going to happen. If this expectation comes true, the user will be pleased and happy. If this expectation is not met, the user will be dissatisfied. The first impression of a website will be the basis of those emotions, and will hold up when a longer period of time is spent on the site.

The contours of a website are the first thing noticeable to the user. An obvious structure in different components of the site will give the user a clear idea of how to navigate through it and therefore offer a pleasing experience.

Contrast will determine where the focus of the user is attracted to. The area with the highest contrast will get immediate attention of the user. It is important that the information the user is looking for is in an area with high contrast, and vice versa. This will prevent the user from reading too much text before finding the desired information, and therefore cause negative emotions. Furthermore, colorblind people are unable to see certain colors and will be completely dependant on the contrast of color combinations. A common rule is to use at least 91% contrast for universal readability [13]. So, designing with high contrast values is a must for both the first impression and accessibility of the website in general.

Symmetry is a design aspect that gives the user a sense of order, harmony and beauty, and therefore causing positive emotions [10].

B. Typography



There are thousands of different fonts worldwide, and every font has its own purpose. For the WikID website, a font suited for reading large amounts of text on a computer screen is desired.

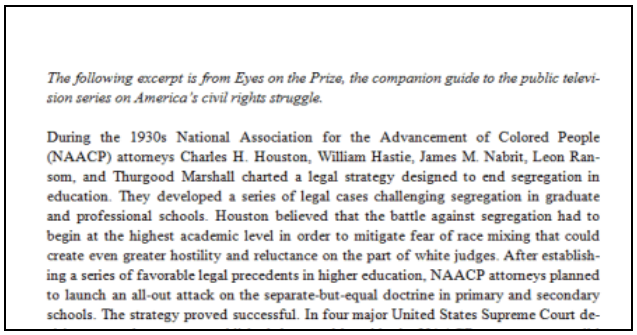
There have been many studies about font size and readability. One of the biggest discussions is the difference between Serif and Sans-Serif. Serif is considered the best type font for reading text on paper and is used in magazines, papers and books for many centuries. However, a computer screen is a different medium than a book or a magazine. The resolution is inferior, about 100 dots per inch (dpi) for the computer screen versus 300 dpi or even more for printed material [14]

A research by Wilson [15] showed that 68% of the participants preferred a sans serif font above a serif font for readability on a computer screen. The comparison between Arial and Verdana showed a preference of 59% for Arial when the size of the text is 12pt and a preference for Verdana when the text is 10pt of smaller.

Verdana is considered a good type font for body text by

website designers because it is a broad and a spacious font, which leaves an ample square space for each letter. This makes it easier to distinguish each character at low resolutions [16]

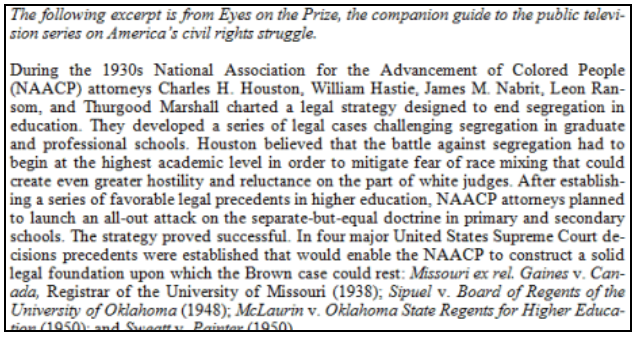
Other factors influencing the readability of the text are line spacing and margins, as shown in Figs. 4 & 5. Texts without margins are read faster than text with margins. On the other hand the study showed that the comprehension of the text with margins was higher than the text with no margins. [17]. In case of the WikID website better comprehension is preferred.



The following excerpt is from Eyes on the Prize, the companion guide to the public television series on America's civil rights struggle.

During the 1930s National Association for the Advancement of Colored People (NAACP) attorneys Charles H. Houston, William Hastie, James M. Nabrit, Leon Ransom, and Thurgood Marshall charted a legal strategy designed to end segregation in education. They developed a series of legal cases challenging segregation in graduate and professional schools. Houston believed that the battle against segregation had to begin at the highest academic level in order to mitigate fear of race mixing that could create even greater hostility and reluctance on the part of white judges. After establishing a series of favorable legal precedents in higher education, NAACP attorneys planned to launch an all-out attack on the separate-but-equal doctrine in primary and secondary schools. The strategy proved successful. In four major United States Supreme Court de-

Fig. 3 Margins and large line spacing



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Fig. 4 No Margins and normal line spacing

The line spacing has no significant effect on the reading speed or the comprehension of the text. The participants however were more satisfied with the overall layout and perceived eyestrain in the case of the text with bigger line spacing.

The participants favored the text with Margins and bigger line spacing by 47%, while 50% of the participants chose the No Margins, Sub-Optimal Leading text as their least favorite. For WikID these results are interesting to achieve an optimal user satisfaction.

C. Color

It is common knowledge that colors and color combinations provoke strong emotions to their observers. Already in the beginning of the 20th century, artist like Kandinsky were experimenting with color combinations and their effect on observers. Nowadays, a lot of research has been done to determine the effect of color combinations. Three sets of color properties has been defined, color activity, weight and heat [18], [19]. These properties define respectively the color's saturation, contrast and 'temperature'. Saturated colors often look very aggressive. However, some 'cold' saturated colors are less demanding and therefore useful. Desaturated colors often look dirty, and probably will evoke negative emotions, so these should be avoided. High contrasts are desired in the textboxes, to improve readability. Warm colors are often saturated as well. Those colors are very much 'in your face', they are very demanding. The new WikID should be pleasing but subtle, therefore 'cooler', but saturated colors will be used.

Emotions provoked by the user often come out of reminded memories or instincts. For example, the combination of yellow and black is often used in nature for danger, and could remind people to bees or wasps. These animals will often imply emotions of fear or even pain. The aim is calmness, and therefore colors which remind people of calm and relaxing situations. These colors could be desaturated colors like blue and green, referring to memories of nature

D. Combinations of Color and Font

Although the colors and fonts are important for the visual appearance of the WikID website, the combination of both the color and the font is even more important.

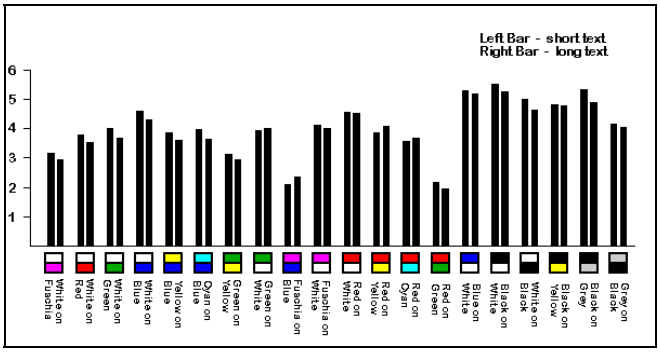


Fig. 5 Background color & text color versus readability [20]

Black text on a white background gives the best readability. [20] The graph shows that blue on white and black on gray also give good results for reading text on a computer screen. When two extreme contrasted texts are compared, black on white and white on black, it shows that the dark text on the light background always gives a better reaction time.

Some participants preferred black text on a light gray background more than black on white because the light of white color that comes from the computer screen has the most intensity, which can hurt your eyes when reading a large text. This is a big difference between reading from a book and reading from a computer screen, which is emitting light. So, although researches show clear results in performances, the user's comfort while reading is even more important.

E. Summary and Recommendations

The user's opinion of a shown website is formed in a remarkably short period of time, 50 milliseconds. In this moment, primarily the website's overall shape, form and color

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is observed. It is important that these will point the user in the right direction, in order to prevent disappointment and therefore negative experiences. Users will appreciate the website working a expected.

The main text on the website should be on the lightest and most contrasting background, so the attention of the user is automatically drawn towards this section. Also, contrasts improve the general readability and make the site better accessible for visually disabled people. It is important to keep in mind that a computer screen is emitting light, and therefore brightness will affect the eyes of the user on the long term, making the user feel tired and strained.

The typography used on a website should be aimed at an optimal readability. Research has shown that sans-serif fonts are considered better readable than serif fonts on a computer screen. Furthermore, text margins make the user read a little slower, and therefore comprehend the text better. Line spacing has no influence on readability, but is rated high in visual appeal. The use of colors in text and background matches the previous statements about contrast and brightness. A dark colored font on a light colored background is considered the best readable.

In general, associations with previous experiences are a useful tool to improve a user's appreciation of the website. However, this works both ways, because associations with negative experiences will make the user feel uncomfortable about the website.

IV. Design Recommendations for the WikID Website

A. Analysis of the Current WikID Website

The conclusions of the previous chapter are the guidelines for an analysis of the current WikID interface (see Fig. 6).

1. The most important links have the same visual appearance as less important links such as 'interesting links'. Because there is no visual difference between the links, the user is unable to know where to start without reading all the links and then make a decision.
2. The highest contrast on the website is in this area marked with a (2) and will draw the first attention of the user. However this banner has no or very little interesting information for the user. More useful is to draw attention to very interesting areas like the navigation (1) or the welcome text (5)
3. The Login link is almost invisible in the high contrast banner. As stated earlier, one of the major issues for WikID is to have and maintain a numerous user community. If people do want to be a member of the WikID community the Login or create account links should be recognizable and easily accessible.

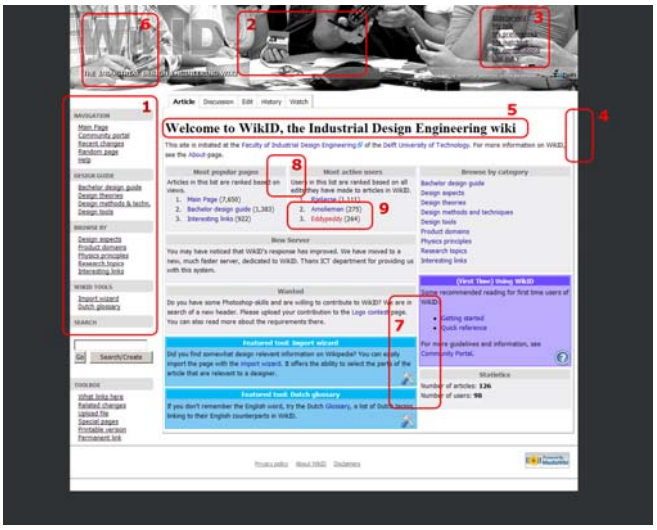


Fig. 6 Analysis of the WikID Main Page

4. Another high contrast is located between the WikID website (white) and its background (dark gray). It is very confusing for the user to read an article on the white area if his attention is constantly drawn towards the left and right side of the website, the positions with the highest contrast.
5. The welcome text has a good contrast (white/black) and has a prominent position on the website. However, the font used is a common font used in Internet Explorer error messages (Figs. 7 & 8), and therefore might provoke negative memories.
6. The size of the WikID logo is sufficient, but the contrast within the banner makes the logo drown in the banner. A recognizable logo will make users remember the website.
7. Colors are used in this area to make messages stand out. In order to compete with the high contrast with the background of the website (4.) unnecessary colors need to be used to make certain area's stand out. The purpose of the blue and purple color is not traceable. When the link to, for example, the import wizard is clicked, the color blue disappears and the association is lost. The difference between blue and purple is hard to see for people with visual disabilities.
8. In this area, opposed to case 7, little contrast is used to mark messages so it is hard for the user to distinguish the different boxes from each other.
9. Three different colors are used for text in this little text box. The user might think this is confusing because he or she might not know what these colors stand for.

Example

An example on the WikID website where the font used matches the font of a well known error message from internet explorer is shown below.



Fig. 7 WikID login succesfull screen



Fig. 8 Error 404, Internet Explorer

This error message is regarded as a negative experience, and therefore the WikID font will provoke the same negative reaction. When you create an account on WikID, the message displayed is shown in Fig. 7. The referred error message is show in Fig. 8. The titles of both messages are in the same font. This might make the user think he or she is encountering an error, but when you read the text it says: login successful. In no way the user is feeling welcome to enter the site.

B. New Design for the WikID Website

Applying the conclusions from the theoretical study to emotional factors for websites, the main page of WikID has been redesigned aiming for pleasurable emotions.

The new design has a light gradient background, with a subtle pinstripe, which look friendly. All the important areas in this design have a drop shadow, as if they are physically overlaying the background. The main menu has a little lighter color than the background, and the main textbox has a white background color. This makes the most important text the most demanding. The login/create account box has the same opacity and color as the main menu, and therefore claims attention from the user, but not at first. This way the user will not feel forced to login or register. This design is very well balanced regarding contrasts, text boxes and colors. It looks friendly and inviting, which are important characteristics for the WikID website.

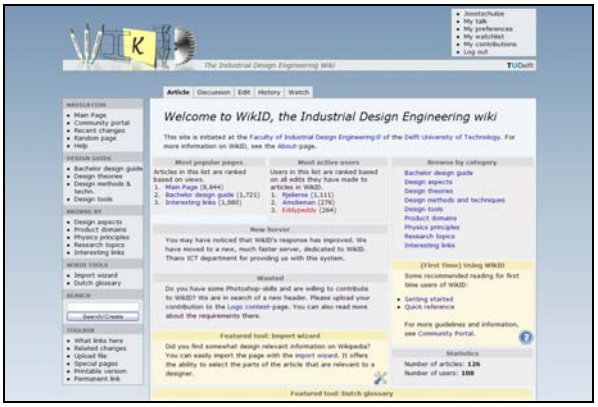


Fig. 9 WikID new design

V. Verification

To verify whether the new design of WikID appeals more positive emotions than the previous one, an online questionnaire is created and one group of respondents is questioned about the old WikID and one group of respondents about the new one. The respondents will be asked to carry out a few short assignments with WikID and then they are asked about their experiences and opinions. It is decided not to show both the designs to all participants of the enquiry, because it would be too obvious which interface was old and which one was new, and therefore would lead to socially-desired answers.

1) Tasks & Actions

In the first stage of the research, the participants are asked to perform some easy tasks to become familiar with the WikID website. These tasks included creating an account, and finding some information on the site. After these tasks, they are asked to describe their experiences during those tasks. The WikID website had to be closed, before proceeding to the statements.

2) The Questionnaire

For a participant in a survey it is most preferable to answers multiple choice questions. Therefore a series of statements is presented, which the user had to (dis-)agree with. A way to gather reliable answers is an answer sheet with a Likert scale. This scale is shown below.

Agree 1 2 3 4 5 6 7 Disagree

Fig. 10 7 point Likert Scale

Positive and negative questions to prevent desired answers so the answers will change between agree and disagree to ensure that the user uses the whole scale from 1 to 7 and have the respondent give more thoughtful answers.

A scale from 1 to 7 is preferred above 1 to 5. Users usually do not give extreme answers like 1 and 7. A useful scale from 2 to 6 is what remains. When using a 1 to 5 scale without the

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extreme answers 1 and 5, a scale from 2 to 4 remains. This scale is very limited to get significant differences between answers.

One positive and one negative question is asked about each topic. This will prevent desired answers as well. [21]

3) Statements

a) Structure and clear arrangement of the website

If the website is clearly arranged and the structure is made visually clear, than the user will be able to find the information faster. This will increase the user excitement for the WikID website. Statements:

- The WikID website is neatly arranged (see Fig. 11)
- It is not clear were the most important features of the website are located.

b) Readability

The aim is a good readability of WikID which will improve the speed of navigation and reading of a large text. When the user can read the text in a comfortable way and is not distracted by other factors, he or she will feel pleased. Statements:

- The website is pleasing for the eye
- The website's various elements distracted me while reading

c) Emotions of the user

Users have emotions when visiting a website. The visual appearance should stimulate the user's positive emotions. Feeling welcome on a website is important for a user. Statements:

- I feel welcome on the website (see Fig. 11)
- The website looks hostile

d) Connection between Industrial Designers and the WikID website

The question is whether industrial designers feel connected to the WikID website and if they recognize the website as a site they want to be part of. Statements:

- I think WikID can provide useful information for my design process (see Fig. 11)
- As a designer, I feel connected to the WikID website
- The appearance of the website does not match my expectations of a website aimed at industrial designers

e) Active participation in the future

For a wiki it is very important to have a good active user community. In order for users to return to the website they must be pleased. To measure the willingness to return to the WikID website the following statements are presented:

- I will visit the WikID website more often in the future to gather information (see Fig. 11)
- I will visit the WikID website more often in the future to add or edit information (see Fig. 11)
- I would recommend WikID to other designers

B. Subjects

The WikID website is aimed at industrial design engineers. Therefore, 30 students, teachers and other people with experience in the field of design were asked to participate in the questionnaire. These people are divided in two randomly chosen groups, one to test the old website, and one to use the new one.

A couple of participants were showed the other interface after completion of the questionnaire to be able to monitor their reactions and comments.

VI. Results

A. Reviews of the Answers to the Open Questions

"Could you briefly describe your experiences while creating an account?"

Comparing the answers to this question which was asked after performing the 'create account' action, a distinct difference is found between the old and the new WikID skin. At the old WikID: 12 out of the 15 respondents were not able to find the 'Log in' link on the main page right away. Three found the link after some searching, reading or through the 'help' link. Even three people were not able to find the link at all, so they did not succeed in performing the 'create account' task they were given. With the new WikID website, the 'create account' task is easily completed by all respondents. Only one respondent was not able to find the link right away.

"Could you briefly describe your first impressions of the website?"

For both the old and the new website, the most heard answer is 'too much text'. For designers it is very natural to show information in a visual way. The site is chaotic and it is not immediately clear where tot start your search for information.

There are a few positive answers about the color of the website and structure for the new WikID while the old WikID is described boring and old fashioned.

"What is your opinion about the layout of the article?"

The old WikID is described clear by almost all participants but a bit boring and a kind of hard to read font type. The new WikID is also considered clear by most participants but there are more positive reactions.

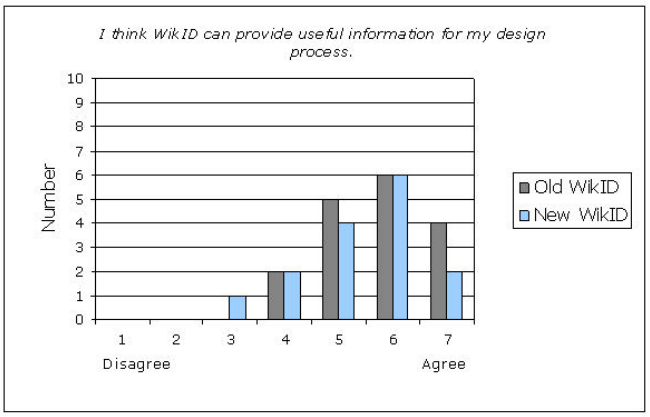
"Were you able to quickly find the required parts in the text? Why (not)?"

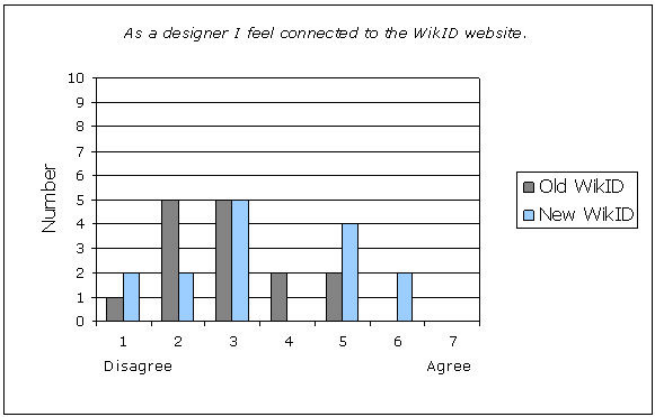
The answers to this question are pretty much the same for the old and the new WikID.

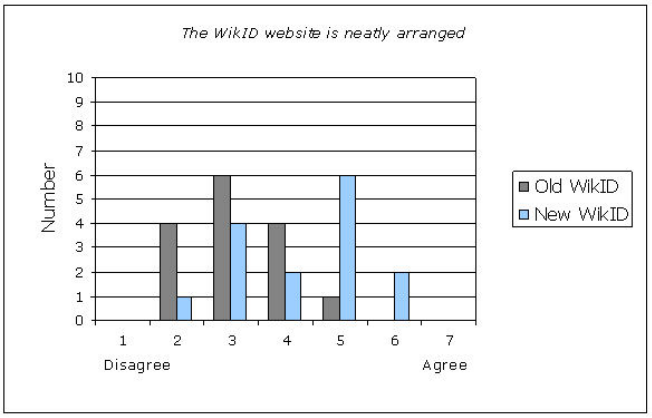
B. Likert-scale Questions

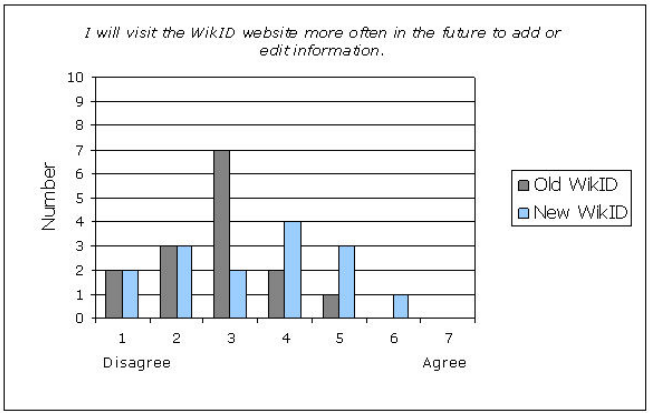
In the next pages the Likert-question results are presented. The results from the old WikID are in blue, where the results of the new WikID are in purple. All data is scaled to percentages, to make a fair comparison.

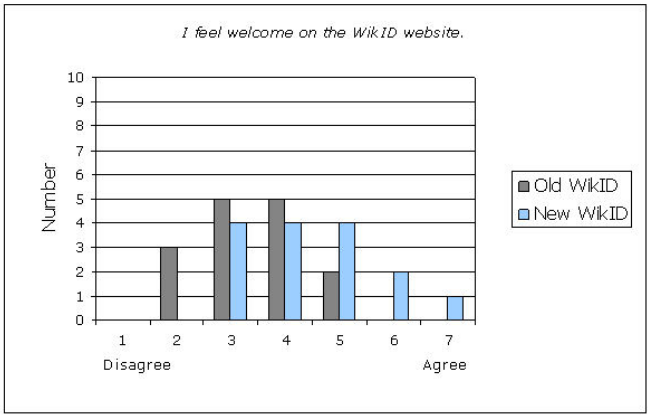
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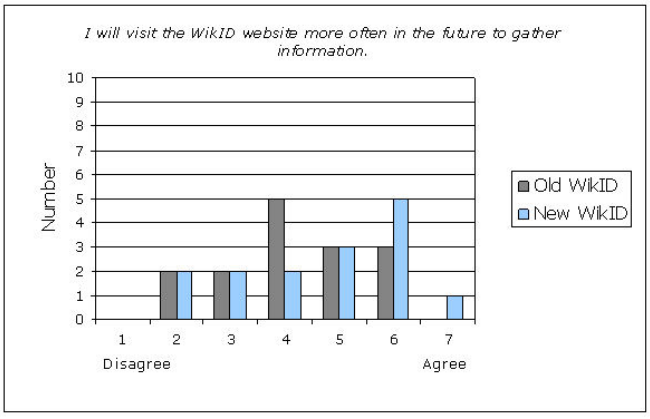


Fig. 11 Some results of the questionnaire

C. Direct Comparison

Previous to the research, 3 test persons were shown both the new and the old WikID. They were all very positive about the new design. They thought it was more inviting and friendly. The used color and fonts made the website clearer and easier to read. These comments match the outcomes of the research.

VII. Conclusion

The first and most striking conclusion is that neither the old nor the new WikID was regarded a ‘designers’ website. This was mainly because of the large pieces of text presented on the main page and the lack of (clear) images in the articles. Although WikID is a website providing clear and short information on ‘design’ topics, al lot of people wanted the information to be more visually supported.

The second conclusion is that the new WikID is regarded to be more clear, and more user friendly than the old WikID. This results in higher scores on the questions if people think they will come back to WikID more often. These answers imply that the new layout of WikID will contribute to an expanding user community.

Although the new interface of WikID was aimed to be more pleasing to look at, no explicit difference was measured between the old and the new site. This could be caused by the large amounts of text on the main page, possibly ‘scaring’ first time users. The menu structure on WikID was considered to

be not very clear and easy to use. This is definitely a point of improvement. The 'softer' colors used on the new WikID makes the website look more friendly than the old WikID.

The arrangement of the new website was considered to be better than the old website. This means that the 'design for guidance', high contrast for important parts and lower contrast for less important parts, worked. The words on both WikID's are exactly the same, on exactly the same place, but still the new WikID scores better than the old one. Also the font used on the new WikID was rated higher than the old one. People testing the old WikID had some complaints about the font used, versus no complaints about the new font.

The final conclusion is that the new WikID is improved, the new WikID website was considered better than the old one (See Fig. 12).

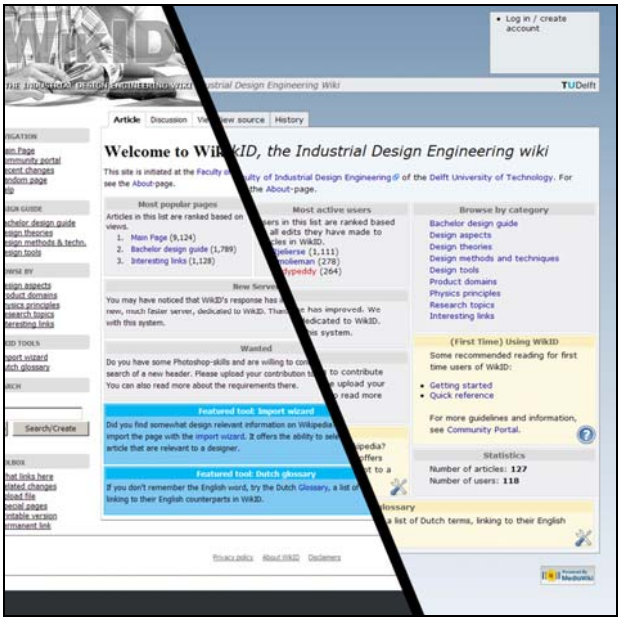


Fig. 12 Transformation of the Main Page of a Wiki

VIII. Discussion

The research was successful and the results came close to the expectations. However it was expected to see greater differences in ratings between the old and the new WikID. The reason for this moderate result is because the impact of the (unchanged) text on WikID could have been underestimated. A lot of test persons rated the new WikID in a direct rating almost as low as the old one. Only in more subtle questions about the styling and interface, the difference between old and new became clear.

In the research it is decided to show only one of the WikID's to the participants to prevent people to give desired answers. However, the consequences of this decision were that none of the participants had any comparison to base their answers on. This resulted in hardly any difference in rating of the websites. The few people who are shown both the websites immediately showed their preference for the new WikID.

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