

Igazolás tudományos publikációs tevékenységről

Igazolom, hogy **Megyeri Mária** a 2020/21-es tanév I. félévében – az Új Nemzet Kiválósági Program keretein belül tett vállalásának megfelelően – **a graduális (műszaki menedzser mesterszakos) képzése alatt** tudományos publikáció megírásával és benyújtásával kapcsolatban tevékenykedett.

A hallgató a mellékelt konzultációs lapnak megfelelő ütemtervben haladva nyújtotta be az **angol nyelvű, nemzetközi publikáció első kéziratát az Ergonomics In Design folyóiratba.**

A hallgató „EID-21-012” azonosítóval ellátott eredeti kézírata, azóta a bírálói véleményeknek megfelelően átdolgozásra került („EID-21-012.R1” változat), amely feltételesen elfogadásra – „Accept pending minor revision” állapotba – került. Ennél a változatnál a szerkesztőség már csak a nyelvi lektorálást hiányolta, amelynek megfelelően a kézirat újabb, nyelvileg javított („EID-21-012.R2”) változata a felelős szerkesztő (Senior Editor) döntésére vár.

Megyeri Mária a publikáció megírásával kapcsolatos feladatokat a tudományterület, és a folyóirat elvárásainak megfelelően, lelkiismeretesen, mindig határidőre és precíz módon végezte el.

Mellékletek:

- Konzultációs lap (1 oldal)
- Ergonomics In Design bírálatok (1 oldal)
- A publikáció kézírata (18 oldal)

Budapest, 2021. május 26.

Dr. Hócegfő Károly



Szabó Bálint

Szabó Bálint

egyetemi tanársegéd, témavezető

KONTULTÁCIÓS LAP ÚJ NEMZETI KIVÁLÓSÁG PROGRAM (ÚNKP-20)

ÚNKP ösztöndíjas neve:Megyeri Mária

ÚNKP pályázati azonosító: ÚNKP-20-2-I-BME-400

Témavezetett neve: Megyeri Mária			Témavezető neve: Szabó Bálint Témavezető beosztása: egyetemi tanársegéd		
A konzultáció ideje (dátum, óra, időtartam)	A konzultáció módja (személyes, skype ...stb.)	A konzultáció helye (ha személyes)	A konzultáció témája (egy mondatban)	Témavezetett aláírása	Témavezető aláírása
2020.09.14. 14:00 – 14:30	személyes	BME, Q ép. A szárny I.em.	Elméleti alapok kibővítésének lehetőségei, további szakirodalmak gyűjtése	Megyeri M	Szabó B
2020.09.21. 14:00 – 14:30	személyes	BME, Q ép. A szárny I.em.	Előző féléves kutatási eredmények tisztázása, logikai rendezése	Megyeri M	Szabó B
2020.10.13. 10:00 – 10:30	Ms Teams		TDK dokumentáció megbeszélése, véglegesítése	Megyeri M	Szabó B
2020.11.10. 15:30 – 16:00	Ms Teams		TDK konferencia előadásanyagának átbeszélése (prezentáció)	Megyeri M	Szabó B
2020.12.02. 10:00 – 11:00	személyes	BME, Q ép. A szárny I.em.	Publikációval kapcsolatos megbeszélés, publikáció megjelenési helyének keresése	Megyeri M	Szabó B
2021.01.07. 16:00 – 16:30	Ms Teams		Publikáció első változatának összeállítása	Megyeri M	Szabó B
2021.01.14. 15:30 – 16:00	Ms Teams		Publikáció magyar nyelvű változatának tisztázása	Megyeri M	Szabó B
2021.01.20. 15:30 – 16:00	Ms Teams		Publikáció angol változatának átnézése, tisztázás	Megyeri M	Szabó B
2021.01.29. 16:30 – 17:30	Ms Teams		Publikáció beküldésével kapcsolatos megbeszélés	Megyeri M	Szabó B

Ergonomics in Design - Decision on Manuscript ID EID-21-012.R1

Feladó: **Ergonomics in Design: The Quarterly of Human Factors Applications**

<onbehalf@manuscriptcentral.com>

Tárgy: Ergonomics in Design - Decision on Manuscript ID EID-21-012.R1

Másolatot kap: <Rammohan.Maikala@providence.org>

Dear Author:

Thank you for submitting your manuscript number EID-21-012.R1 titled "Investigating the effectiveness of user onboarding solutions with eye tracking: A case study on Paint3D" and for your patience during the review process. I have now received two reviews from experts in the areas of your paper. Their reviews are appended to this letter or attached to this email. I have also read your submission and the comments. Although reviewers are happy with your changes, I strongly believe that the manuscript must be thoroughly revised to improve its written quality. Please revise the English language with a help of native English speaker or SAGE Language Editing Services (<https://languageservices.sagepub.com/en/>) before your final submission. Your manuscript is likely to be accepted for publication upon successful language editing.

I encourage you to revise and resubmit this paper as soon as possible. Thanks again for your interest in "Ergonomics in Design".

Sincerely,

Dr. Ashish Nimbarte

Senior Editor, "Ergonomics in Design"

Ashish.Nimbarte@mail.wvu.edu

Reviewer(s)' Comments to Author:

Reviewer: 2

Comments to the Author

You have been thorough in addressing the reviewer's concerns. This paper is a good contribution to EiD. The field will be strengthened by your description of methods for assessing onboarding.

Reviewer: 1

Comments to the Author

Thank you for making the revisions to your submission. It is now more understandable and shows the value of incorporating clickable prototypes into software to assist in onboarding.

Az eredeti példánnyal teljesen
megegyező hitelesített másolat

2021. 05. 26.

Bálinti Pál

Ergonomics in Design

Investigating the effectiveness of user onboarding solutions with eye tracking: A case study on Paint3D

Journal:	<i>Ergonomics in Design: The Quarterly of Human Factors Applications</i>
Manuscript ID	EID-21-012.R2
Manuscript Type:	Long feature, no sidebar
Keywords:	user onboarding, usability testing, Eye tracking < PSYCHOLOGICAL/PSYCHOMOTOR, user experience, software ergonomics, case study
Note: The following files were submitted by the author for peer review, but cannot be converted to PDF. You must view these files (e.g. movies) online.	
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FEATURE AT A GLANCE

This paper examines the user’s first experience with a new software application, called the user onboarding process. In addition, we conducted a series of usability experiments with 18 participants, which were supported by eye tracking technology, to explore the effectiveness of different user onboarding solutions, exemplified by the newest version of Paint. We also explored users’ feedback on onboarding solutions in a series of interviews. The results showed that user onboarding solutions are generally effective, making it worthwhile for computer-software companies to provide them to support new users’ activity as well as to increase the value of their products.

Keywords: user onboarding, usability testing, eye tracking, user experience, software ergonomics, case study

1. THE SIGNIFICANCE OF SOFTWARE ERGONOMICS

As software became popular from the 1980s onwards, the field of human-computer interaction (HCI) was born. Developers and ergonomics professionals started working together to build more and more user-friendly interfaces (Hustak & Krejcar, 2016). Software that has a user-friendly interface and follows ergonomic guidelines enhances the working experience, reduces the number of errors stemming from incorrect use and guarantees the exploitation of all the services of the software. The aim of software ergonomics therefore is to make digital products easy to use while ensuring that they live up to user requirements (Knittle, Ruth, & Gardner, 1986).

Software ergonomics has lately become one of the key aspects of software development, making usability a central issue and a focus on later user experience essential (Hartson & Pardha, 2019; Knight, 2019). These concepts are defined differently in the literature and in standards. Nielsen (1994) for example regards usability as a multi-dimensional concept, which can be interpreted along the lines of subdimensions such as learnability, efficiency, memorability, errors, and satisfaction. However, user experience (UX) amounts to more than usability, because the expression refers to the sum of impressions and feelings that are aroused in a user while they are using the product (Quñones et al., 2018).

Since UX has become a trending topic, it is now widely accepted that it should be an integral part of the entire software design process – from the early concept to the released product (Kapusy & Lógó, 2020). The design process should also consider it worthwhile to pay attention to the first user experience, which is formed during the onboarding period, when the user is using the product for the first time. The time of the first interactions between the user and the product is the moment where motivations come into play, so effective onboarding is essential for any software whose developers are interested in acquiring more users or subscribers. Consequently the overall strategy (the flow, messages, interactions and UI design elements) should be planned carefully to support new users' engagement (Cardoso, 2017). Among UX experts, effective user onboarding – which describes the path of sequential steps and interactions that users go through with a product – is considered to be the most important part of the user journey due to its potential to reduce user churn by guiding users to a better understanding of the value of a software application while they are still exploring it (Terres, Klumpe, Jung, & Koch, 2020).

Following the expansion of the software market, onboarding became an important element contributing to a digital product's success; therefore, it is worth dealing with it in all cases. The goal is to provide a positive experience for the software's user right from the first

use (onboarding period) when they merely learn how to use the software, because effective user onboarding positively affects users’ intentions to use a product; it thereby actively shapes the users (Terres et al., 2020).

2. ABOUT USER ONBOARDING

The expression of “onboarding” became known mostly in human resources (HR), where it means the efficient integration of newcomers to the organization. This is quite an important process, for it is in the interests of every employer to make it easy for new colleagues to settle in; to integrate them into the work processes and to have them build good relations with other employees (Bauer & Erdogan, 2011).

The short period when a new user tries out a product for the first time and comes to understand what exactly it is for can be considered the onboarding phase in the field of software ergonomics. In a broader sense, there are three separate parts of the onboarding process according to Agrawal (2019) during which the potential user becomes a power user (Figure 1.)

Figure 1.: Evolution of user levels during onboarding (based on Agrawal (2019))

In practical terms, onboarding begins with information seeking (1st phase). This is when potential users see the product as a possible solution to their problems. This is followed by the part (2nd phase) which determines if the user realizes the true value of the product (Aha! moment) and becomes a dedicated user or not. The Aha! moment is the result of an unexpected, intuition-based enlightenment that leads to a sudden understanding of a hitherto unsolved problem or situation (Kounios & Beeman, 2009). Hence, it is important to demonstrate the real value of the product during its’ first use, because this helps users get to the Aha! moment.

In this phase, all user onboarding solutions enhancing the first use of the product are important to make sure that users feel happy and subscribe (good examples of this are tutorial videos, tool tips or interactive product tours).

Encouraging frequent use of the product – to boost the value of the product – requires different tasks at different times during the whole onboarding process (Table 1). We have to choose the right channels and the appropriate tools to support the users in becoming experts and developing an emotional attachment to the software product and a commitment to the brand (3rd phase) (Agrawal, 2019).

Table 1: The combination of timing, task, channel, and tools in each phase

As seen in Table 1, the user onboarding solutions appearing in the 2nd phase play a crucial role in the whole process: they support the users during their first time with the product to discover the values of the product. According to Hulick (2014), user onboarding increases the

chance that users become successful when they first use the product. Singer (2011) notes that user onboarding is the process that convinces the customer to return. The relation between the user and the software starts here, so we must elaborately plan all elements (strategy, messages, interactions, design elements etc.) to boost user experience and support the commitment of new users.

2.1 SCIENTIFIC OVERVIEW OF USER ONBOARDING

There are some scientific publications in this field, but they examine the efficiency of onboarding solutions related to web-based products mostly not in an empirical but in a heuristic way. Cardoso (2017) investigates the effect of the first user experience on commitment in the case of crowdsourcing websites. By contrast, a German research group outlined the onboarding tools of massive open online courses (MOOC) and suggested an ideal solution that can be applied in similar learning managements systems (Renz, Staubitz, Pollack, & Meinel, 2014). One of the newest, empirical studies in the field examines the effect of financial incentives offered during the onboarding process on customer behavior, exemplified by a car rental interface (Lu & Ou, 2018). A study from last year shows the user problems surfacing after the installation of the Snapchat application, with the help of usability testing and affinity diagram. They measured how easily the users can navigate in the application during their first time with the product (Kapusy & Lógó, 2020). Thus, the examination of the efficiency of different onboarding solutions in software products is a *terra incognita* and it is also scientifically novel.

3. THE AIM OF THE STUDY AND APPLIED METHODOLOGY

The aim of the study presented in this article is the examination of the efficiency of two well-known onboarding practices. The research involved 18 people (9 women, 9 men) from the 20-35 age group (24.7 on average with a 3.66 standard deviation). Participants had to perform different tasks in Paint 3D as part of the usability test. Only a couple of participants knew about the program before, but nobody used it to solve a specific task. They however were already users of other graphics and/or designing programs (like Photoshop, InDesign, Illustrator) due to studies or work.

The 18 participants were separated in 3 groups: the members of the reference group performed the tasks of the efficiency study without onboarding solutions, while the remaining 12 participants watched different onboarding solutions before carrying out the tasks in two separate groups. One of these groups of 6 were shown tutorial videos beforehand (Group 1), while the other group (Group 2) was shown an in-house, clickable visual onboarding solution that explained the important functions (Figure 2).

Figure 2: Onboarding solutions applied in the study

Link for the complete in-house, clickable onboarding solution:

<https://www.figma.com/proto/GWVaEHXaJ6JdkdIYgB7aG6/Paint-3D-tutorial>

We divided the usability tasks into two parts with varying levels of difficulty to test different functions of the program. The simpler part involved smaller tasks that could be carried out with using the basic functions (like creating lines and simple shapes; coloring; using brushes). The complicated part was about creating a three-dimensional version of a picture by using the new functions of Paint 3D.

During the study, the participants provided feedback with the concurrent think-aloud method and formed their opinion about the software product. The point of thinking aloud is to make the participants verbalize their thoughts and say out loud what they do and why. In this way, we can see the difficulties that may occur while using the product (Jääskeläinen, 2010).

We evaluated the usability test with reference to three indicators: task completion time, plus the number and severity of errors. We also supported the usability tests with a Tobii eye tracker, which fixes the exact direction of the gaze during task execution, thereby producing useful feedback.

The task ended with the completion of the System Usability Scale (SUS) questionnaire, which helps extensively measure the product's usability with 10 questions (Lewis, 2018). The usability tests were complemented by follow-up interviews in Group 1 and 2 to explore the participants' opinion about onboarding solutions (Figure 3).

Figure 3: Research plan

Before the usability test, we defined five hypotheses about the efficiency of onboarding methods. These were:

Hypothesis 1: Due to onboarding solutions, users experience less errors.

Hypothesis 2: Due to onboarding solutions, the number of experienced errors is smaller in the cases of the most important usability issues.

Hypothesis 3: Due to onboarding solutions, users solve the tasks faster.

Hypothesis 4: Due to onboarding solutions, the execution of the same tasks becomes more conscious, resulting in different heatmaps.

Hypothesis 5: Due to onboarding solutions, users find Paint 3D more usable, thereby producing higher SUS test results.

4. RESULTS

Throughout the usability tests, users belonging to the reference group experienced 26 different errors in the Paint 3D program. Members of Group 1 on the other hand experienced

only 18 flaws after watching the YouTube video whereas members of Group 2, having used the clickable, visual onboarding solutions only experienced 13 usability problems.

We examined the problems during the evaluation based on the Nielsen severity scale, which rates the errors on a 4 point Likert scale (Tullis & Albert, 2013).

The 4th category contains the most severe errors. These are problems that practically make successful execution impossible. Such were the difficulties concerning the location and selection of the texture tools; the basic actions with three-dimensional figures; and the usage of the “Magic Select” tool. These were problems arising with all members of the reference group. In the 3rd category we can find serious usability problems, the correction of which should get high priority (for users it was not clear for example that they can rotate and move the objects by using the icons around them). Of course, several other minor errors were mentioned, like the fact that you cannot cut three-dimensional figures out of each other (2nd category) or that the brush types are not easily distinguishable (1st category).

These errors appeared 58 times in total in the case of the reference group, while the number was lower in both groups that received onboarding support (46 in Group 1, 22 in Group 2) (Table 2).

Table 2: Frequency of errors by severity category

The basis of Hypothesis 1 was that the different errors experienced by the reference group occur less due to onboarding solutions, because they already have extensive knowledge about the program before they start the task, because their mental model of the product was closer to the real (physical) model (Weinschenk, 2011).

We can compare the frequency of the 26 experienced errors in the reference group one by one to the results of the other two groups using the Wilcoxon signed-rank test. We applied this method as a non-parametric alternative to a paired-sample t-test, because of the small sample size ($n=26$) to compare the frequency of occurrence of the same errors pairwise.

Based on this, the frequency of errors only differs significantly from the reference group in the case of Group 2 (who received a clickable, visual onboarding support) ($Z=-3.423$, $p=0.001 < 0.05$). The difference is not significant with Group 1 ($Z=-1.688$, $p=0.091 > 0.05$).

Based on the facts mentioned above, we partly accepted Hypothesis 1 in this sample. In other words, due to the support of the visual, clickable onboarding solution, users experienced less errors (which was not true when tutorial videos were shown).

The starting point of Hypothesis 2 were the usability issues that had been assigned with severity ratings. Looking at the frequency of usability issues by severity ratings as a usability issue analysis can be very informative since in this case it is an indicator of whether the

onboarding solutions are addressing the most important usability issues (Tullis & Albert, 2013). Errors experienced in different severity groups can also be examined by using the same Wilcoxon test as in the case of Hypothesis 1.

In case of the most important usability issues (errors belong to severity category 3 and 4) the number of experienced errors were also only smaller in Group 2 ($Z=-2.783, p=0.005 < 0.05$), while in Group 1 it was not true ($Z=-1.283, p=0.2 > 0.05$). Based on these results we partly accepted Hypothesis 2. In other words, due to the support of the visual, clickable onboarding solution, the number of experienced errors were smaller in case of the most important usability issues.

Based on the experiment, we can conclude that task completion times were also shorter with the help of onboarding solutions (Table 3).

Table 3: Task completion times (TCT) of different tasks

This can also be examined with the same paired samples (Wilcoxon) statistics due to the line-by-line comparison of task completion times regarding to the same tasks. Results conform Hypotheses 3 for both groups ($Z=-3.181, p=0.001 < 0.05$ and $Z=-3.408, p=0.001 < 0.05$). We can therefore accept Hypothesis 3 and say that participants who received onboarding support executed the tasks faster.

The application of eye tracking technology allowed us to fix the exact direction of the gaze to determine the place and duration of fixations (Holmqvist et al., 2011). This information can also be portrayed visually, which further helps our work (Duchowski, 2007). The most common form of depiction is the heatmap visualization, in which all user data is shown as an aggregate. The points most often watched are marked with red, while the less watched areas are marked with a colder, greener color (Figure 4) (Szabó, 2020).

Figure 4: The heatmaps of the 3D rotating tasks without (left) and with onboarding (center and right)

We queried heatmaps for critical tasks, like the rotation and moving of an inserted (fish) figure in 3D. Based on the results of the reference group we can say that the icons around the selected 3D object – with which the task could have been performed – were hardly looked at by the participants. They were instead looking for solutions in the menu on the top and on the right. This was because they were used to that setup in the previous version of the tested software.

In the other two groups it seems – based on the visualizations – that users looked at the menus on the top and on the right for solutions fewer times, because during the onboarding solutions they learned that they could use the icons around the object to solve this task. Because

eye tracking software make it possible to select different Areas of Interest (AOI), we tested the hypothesis by defining the menus on the top and on the right (Figure 5) and queried quantitative data related to them (Table 4).

Figure 5: Defining AOI for 3D rotation task

The number of the fixations and the visit count indicate the subjective importance of the given area (Jacob & Karn, 2003), so the test of Hypothesis 4 was conducted with these indices using Mann-Whitney U test. We used this test as a non-parametric alternative to an independent sample t-test to compare the differences between two independent groups based on the number of fixations and the visit count variables.

Table 4: Quantitative information for the selected AOI

Compared to the reference group, there was a significant difference in the number of fixations, so we can conclude that due to the onboarding methods, users in both groups were looking much less at the elements of the upper ($U=1$, $Z=-2.727$, $p=0.006 < 0.05$ and $U=0$, $Z=-2.903$, $p=0.004 < 0.05$) and the side menu ($U=4$, $Z=-2.242$, $p=0.025 < 0.05$ and $U=0$, $Z=-2.887$, $p=0.004 < 0.05$), because they knew that 3D rotation cannot be executed there. Since in one case there was a tendential difference in the number of visits in these areas, Hypothesis 4 was only partially accepted. Hence, heatmaps confirm that onboarding methods only help a more conscious task execution when it comes to the number of the fixations.

Percentage results calculated based on the SUS tests filled out by the participants show how each participant viewed the usability of the program. Test takers who were supported by onboarding clearly achieved a higher score, making group averages higher too (Table 5).

Table 5: SUS results

When using the Mann-Whitney U test on the independent samples of Table 5, we may compare the reference group to the video and clickable onboarding solutions, and we can see that there is no significant difference between them in the SUS values ($U=8.5$, $Z=-1.535$, $p=0.125 > 0.05$ and $U=11.5$, $Z=-1.048$, $p=0.295 > 0.05$). Consequently, we had to reject Hypothesis 5, meaning that participants do not consider the program more usable because of onboarding methods.

We explored the opinion of participants in Group 1 and 2 about the onboarding methods in an interview, which we conducted immediately after the usability test. Based on this, we can conclude that in general, all participants liked receiving onboarding solutions before carrying out the task. They all regarded these as excellent software tutorials that greatly supported new users in getting to know the basic layout and the functions of the program. The usefulness of

visual tooltips and animated, interactive tutorials were emphasized by almost all interviewees, and participants also highlighted the importance of gamification when learning to use a product.

The general opinion was that thanks to the onboarding support, they already knew where to look for certain functions when launching the program and the interviewees highlighted that without onboarding support, it is difficult to start using software which have a lot of functions and depth.

5. CONCLUSION

User onboarding has become important in HCI research (Cardoso, 2017; Kapusy & Lógó, 2020; Renz et al., 2014; Terres et al., 2020), because effective onboarding solutions can help new users discover a product's value and thereby making the learning process more successful during the first use.

This study shows that onboarding solutions can be demonstrably efficient according to several indices, making their use in combination with newly introduced software worthwhile in terms of improved user experience, application learnability and user commitment.

We can conclude that in this study, onboarding solutions applied in usability tests resulted in more conscious task executions. This was confirmed with eye tracking technology which is a powerful tool within usability testing; it also makes it possible for us to see what the user is looking at on the screen while completing tasks. It was used in this study to comprehensively and objectively evaluate the effectiveness of different onboarding solutions based on the number of fixations indicator.

It was also clear that participants who received onboarding support were much faster at solving tasks than the members of the reference group, a finding which also proves the effectiveness of onboarding.

In two cases – concerning the frequency of errors, and the most important usability issues – the audio-visual solution did not turn out to be efficient. However, in these cases the clickable, visual onboarding did lead to better results, which leads us to the conclusion that the latter is more suitable for integration into software products.

Participants' opinions were also revealed after the usability test, which pointed out that the onboarding solutions that were applied in the study greatly helped with task execution.

In conclusion, developing onboarding solutions is well worth considering in highly competitive markets, such as the Information Technology (IT) industry. Software providers should attach great importance to their user onboarding strategy to positively affect users' software usage intentions and thereby actively shape user activation outcomes during further product use.

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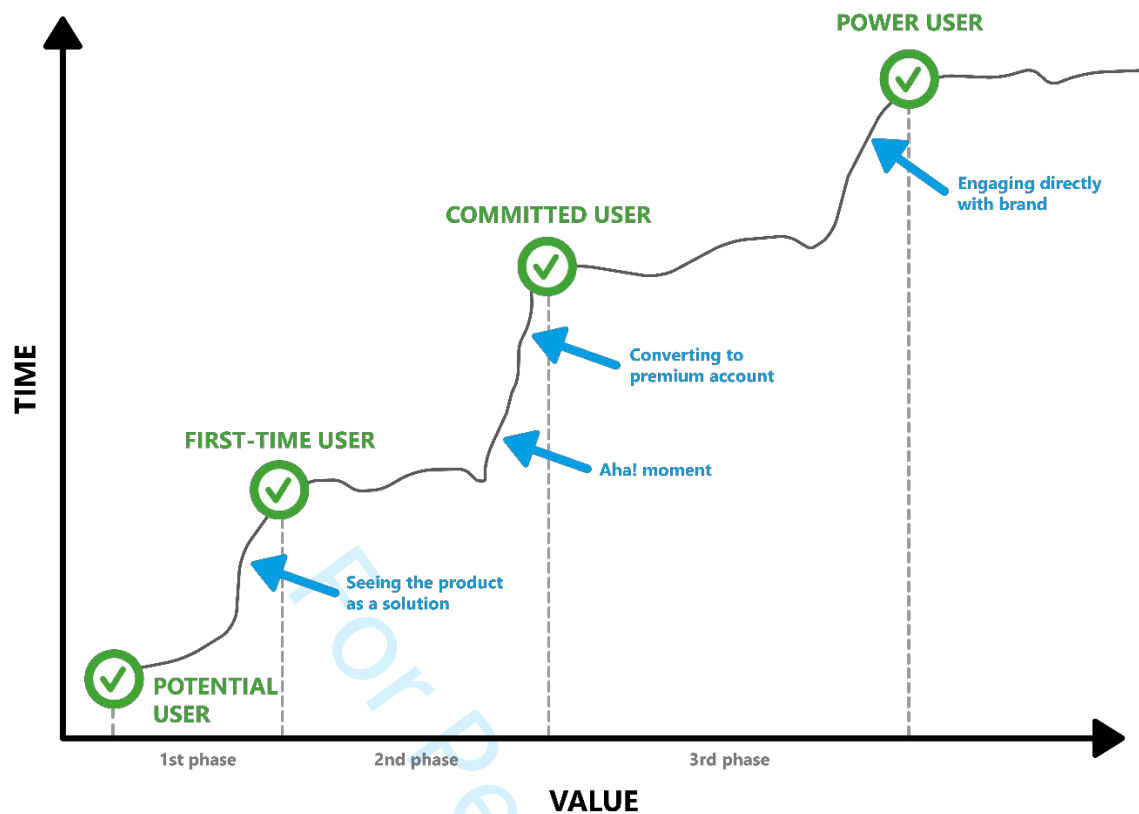


Figure 1.: Evolution of user levels during onboarding (based on Agrawal (2019))

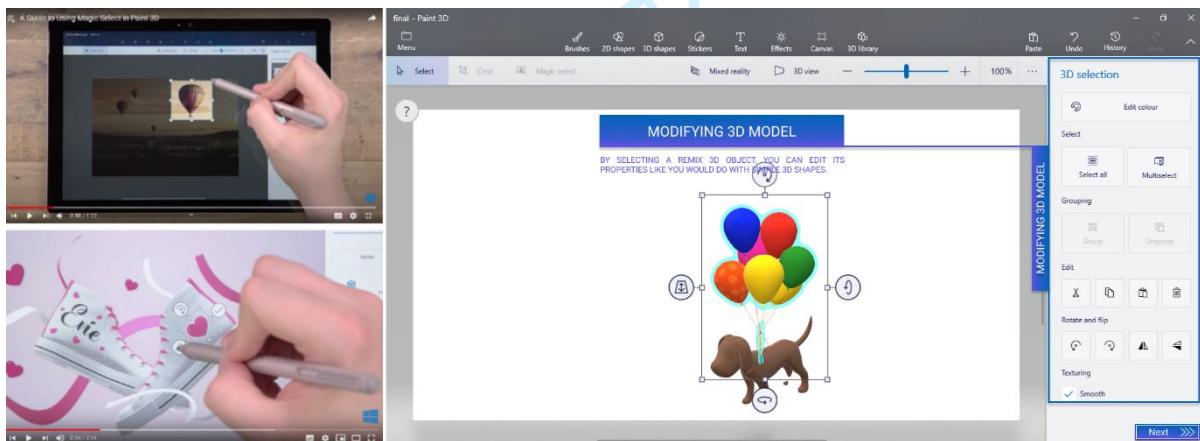


Figure 2: Onboarding solutions applied in the study

Link for the complete in-house, clickable onboarding solution:

<https://www.figma.com/proto/GWVaEHXaJ6JdkdIYgB7aG6/Paint-3D-tutorial>

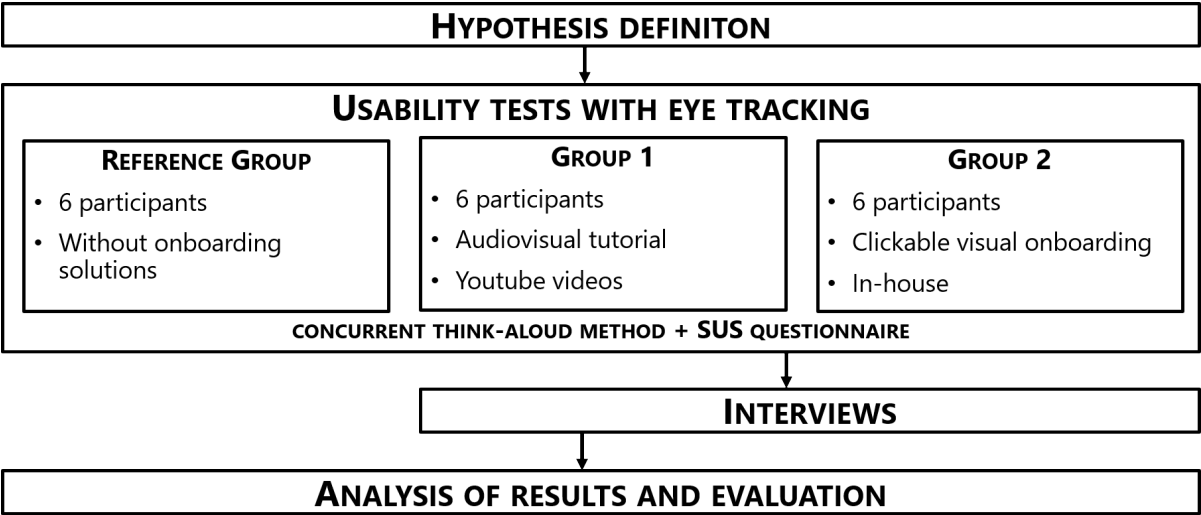


Figure 3: Research plan



Figure 4: The heatmaps of 3D rotating tasks without (left) and with onboarding (center and right)

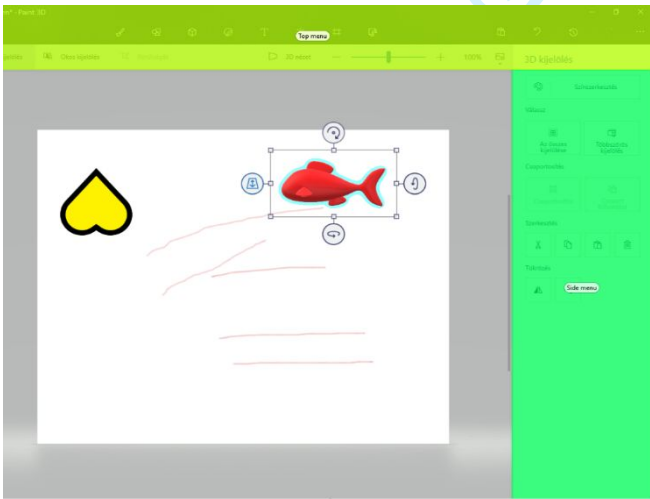


Figure 5: Defining AOI for 3D rotation task

Table 1: The combination of timing, task, channel, and tools in each phase

	1 st phase	2 nd phase	3 rd phase
Timing	Before the first use	When the user already knows the product but did not develop a habit	When using the product becomes a habit
Task	Creating value, highlighting the problem-solving attributes to the product, emphasizing main advantages	Supporting basic use and making it secure, eventually presenting higher level functions	Developing a deeper connection between the user and the product
Channel	Web based marketing tools, search engine ads	Inside the product interface and through the company's customer channels	Conferences, social media
Tools	Online ads, customer case studies and recommendations (as tailored to the users as possible)	Visual or audio-visual onboarding solutions (e.g.: tooltip; tracking user paths and explaining related functions step by step (guided tour); explaining system notifications; emails; videos about the use of the product)	Representative gifts (company shirts, accessories); professional forums, blogs, exclusive photo-, video-, audio materials

Table 2: Frequency of errors by severity category

Severity category	Reference group	Group 1	Group 2
1	6	5	2
2	11	7	7
3	23	15	6
4	18	19	7
Total	58	46	22

Table 3: Task completion times (TCT) of different tasks

TCT in seconds		Reference group	Group 1	Group 2
Usability test Simpler part	Task 1	31.67	12.5	10.83
	Task 2	39.17	30	33.33
	Task 3	80.83	49.17	47.5
	Task 4	140.83	84.17	49.17
	Task 5	65	30.83	45
	Task 6	207.5	113.33	70
	Task 7	118.33	100	72.5
	Task 8	52.5	21.67	28.33
Usability test Complicated part	Task 1	14.17	7.5	5.83
	Task 2	127.5	51.67	31.67
	Task 3	97.5	25	35
	Task 4	286.67	221.67	133.33
	Task 5	210	226.67	120.83
	Task 6	82.5	55	39.17
	Task 7	18.33	17.5	16.67

Table 4: Quantitative information for the selected AOI

	Participant	Top menu		Side menu	
		Number of fixations	Visit count	Number of fixations	Visit count
Reference group	1.	91	18	137	26
	2.	26	11	167	31
	3.	94	17	103	19
	4.	67	13	149	29
	5.	56	23	139	18
	6.	17	5	26	6
Group 1	1.	22	9	102	16
	2.	9	5	101	27
	3.	2	2	8	1
	4.	3	3	83	15
	5.	6	3	14	3
	6.	6	3	44	6
Group 2	1.	0	0	8	1
	2.	2	1	14	6
	3.	0	0	5	2
	4.	0	0	7	4
	5.	3	1	8	3
	6.	4	1	19	1

Table 5: SUS results

Reference group						Group 1						Group 2					
1.	2.	3.	4.	5.	6.	1.	2.	3.	4.	5.	6.	1.	2.	3.	4.	5.	6.
38	70	75	55	65	68	70	73	75	63	70	88	83	75	43	65	68	83
Mean: 61.83			Std. dev: 13.44			Mean: 73.13			Std. dev: 8.33			Mean: 69.5			Std. dev: 14.96		

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