# Usability Study of the "SmartMail" Thunderbird add-on

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Abstract—In this paper we introduce the "SmartMail" add-on for the Mozilla Thunderbird email client, which helps increasing the productivity of users with many international email recipients. We conducted a usability study on 14 participants with university background, which shows an acceleration of time spent writing emails by 62.8% on average as well as an reduced error rate for the chosen language of 47.6% and the gender used in the salutation of 52.4%. After filling in a questionnaire based on the System Usability Scale, the majority of test users rate the user experience and satisfaction as good. Half of them prefer using Thunderbird with this add-on over their own email client.

Index Terms-Thunderbird, Add-on, Usability Study

# I. INTRODUCTION

S part of a software engineering project at Frankfurt University of Applied Sciences (FRA UAS), students of the general computer science Masters' programm developed the "SmartMail" add-on for the *Mozilla Thunderbird* email client. The extension adds new functionality, like the suggestion of gender and language of the recipient, to the software. Figure 1 shows some of the added user interface (UI) elements for indicating the gender in the address bar. This elements helps the user choosing the correct salutation. Furthermore "SmartMail" generates a salutation based on previous conversations and switches its spellchecker into the language of the recipient. This functionality can be seen in figure 2, which shows the email text field.

To test how the add-on is adapted by users and to imrpove further development, we conducted a usability study based on the System Usability Scale (SUS) and the Technology Acceptance Model (TAM). SUS is a commonly used questionnaire to measure effectiveness, efficiency and satisfaction of a user. [1] The TAM is used to model acceptance of software like our add-on by users. [2] The users get to compare their daily used email client to Thunderbird extended by "SmartMail" and fill out a questionnaire with questions about usability, productivity and acceptance. 14 randomly selected test users participated on this study. Each one writes emails to international recipients on regular basis.

This paper first describes the used methods of the executed usability study in section II before presenting the found results in section III and discussing their conclusions in section IV. The appendices A, B, C, and D contain the complete gathered data, the questionnaire used in our study, the list of used dummy names, as well as further diagrams.



Fig. 1. Screenshot of the added gender indicator of the add-on. This feature helps choosing the correct salutation.

i Dear Mr. Doe,	
SmartMail ~	Englisch (Vereinigtes Königreich)
Salutation	



# **II. METHODS**

After introducing the "SmartMail" add-on and the foundations of the usability study in section I, we now describe the step- by-step process and methods used in the performed usability study.

The process for each of our test users starts with the first part of our two-part questionnaire, which can be found in appendix B. This is followed by sending three emails with and three emails without the use of the "SmartMail" add-on, while being constantly monitored. After accomplishing the email tasks, the last part of the questionnaire gets answered. It takes about 7 minutes to answer the questionnaire and about additional 5 minutes to complete the email tasks. Due to both, the qualitative measuring via the questionnaire and the quantitative measuring of the needed time, respectively error rates, we get an overview of the performance of the add-on.

The first page of the questionnaire gets to be filled in before any actual emails are sent. Thereby the testers are asked to provide general information about themselves and their regular usage of email. The collected data is used for the scientific evaluation of the project and is treated in accordance with data protection laws. With it, we get a better understanding of our potential users.

In the next step the tester sends three e-mails each via Thunderbird with and without an add-on to ready-made test recipients. This test step is show the difference between Thunderbird with and without add-on. The recipient for each email is a randomly drawn contact from the address book of Thunderbird, we filled beforehand. The forenames for this dummy contacts are specifically chosen to be common names for females and males as well, while the surnames chosen from common international last names. A list of these names can be found in appendix C. This way, it is not immediately clear for the test user which way to write the email, like it often is with international email contacts. For the salutation in the beginning of the email, the test user needs to decide both, the gender and the language. The choice is between the two common salutations Sehr geehrter Herr / Sehr geehrte Frau in German or in English like Dear Mr. / Dear Mrs..

The content of the mail is a small text provided in German and English form. After determining the language of the recipient, the test user chooses on of the texts and copies it as email content. The total time writing each email is measured in seconds as well as if the participant chooses the right language and gender for the salutation for the recipient.

When writing emails while using the "SmartMail" add-on, the user profits of the inbuilt functions to determine the correct language and gender.

After completing the email tasks, the tester evaluates and reviews his experience with the add-on on the second part of the questionnaire. In this part, he can evaluate the add-on with different statements on a scale of 1 - total disagreement to 5 - full agreement. The tester can also mention the missing functions and suggestions for improvement. The following important points are asked in the survey:

- Is it conceivable to use the system regularly?
- Is the system easy to use?
- Is there a need for technical support?
- Is various functions of the system are well integrated?
- Is there are many inconsistencies in the system?
- Is the tool easy to master?
- How secure is the tester in using the system?
- Is the operation of the program very cumbersome?
- Will using the system make the user's work easier?
- Is it necessary to learn a new functionality before working with the system?
- Which features are you missing from the add-on / What could be possible improvements?

At the end of the questionnaire an important question is asked, whether Thunderbird with the "SmartMail" add-on is preferable to the own mail program of the tester.

The gathered data from the questionnaire is visualized into diagrams by *Google Forms*, while the quantitative measurements are statistically processed in the R programming



Fig. 3. Gathered Information about our test users. Q4: "How many emails are you writing a day?". Q6: "Do you have international email recipients?"

language.

## III. RESULTS

With the methodology we, explained in section II, we can now present the gained results. This section explains the qualitative results of both parts of the questionnaire and the quantitative measurements taken from the gathered data. The focus in this section lies on the most meaningful results of this study, further results and diagrams from the questionnaire can be found in appendix D.

The results of the first part of the questionnaire gives insight of potential users of the add-on and their usual habits working with email. The 14 study participants all have a university background whether as a student, employee or professor. 9 of the participants are male (85.7%) 3 of them female (14.3%). Their age spans from 20 to 61 years, with a median age of 29 years (mean of 35.2 years).

The most commonly used Email programs of our testers are *Mozilla Thunderbird* (28.6 %), *Apple Mail* (21.4 %), *Microsoft Outlook* (21.4 %), *Microsoft Mail* (14.3 %) and others(14.3 %). "Other" email clients include web-based mail programs like *yahoo.com* or *protonmail.com*. This statistic shows a fast and diverse distribution of clients, which is relevant should the "SmartMail" add-on ever support other software than Thunderbird.

The time the participants spent on email on a daily basis ranges from 10 minutes up to 6 hours with a median of 60 minutes (mean of 90.8 min). The number of emails sent in this time, by the participants, is shown in figure 3. It ranges from 1-5 emails a day by 57.1 % of our testers, over 5-10 emails written by 35.7% of testers up to over 10 emails a day, 7.1% of testers. In figure 3 we also see, that the majority of participants (76.6 %) has international email recipients on regular basis, which is not uncommon for users working or studying at university.

The measured data from the six emails sent by the participants gives a good quantitative comparison of using Thunderbird with the "SmartMail" add-on to not using it. To highlight the difference in the data, we also conduct a two





Fig. 4. Time needed for sending an Email is significantly less when using the add-on compared to not using it.



Fig. 5. The gender of the recipient is correctly assigned with the add-on every time.

sided Student's t-test on the mean of the data sets.

Figure 4 shows the differences in time when using the "SmartMail" add-on vs not using it. Without the add-on, the time needed for the correct assignment of language and gender needs on median 28.5 seconds (mean 32.26 seconds). With the use of the add-on, the time needed gets reduced to an median of 12.54 seconds (mean of 12.0 seconds). The difference of 15.96 seconds (mean 20.26 seconds) indicates a significant (p = 3.455e-08) decrease of time spent on this decision.

As it can be seen in figure 5, the number of falsely assigned genders for the salutation decreases from 22 (52.4 %) to 0 when using the add-on. This significant improvement (p = 4.16e-08) is most likely due to the additional UI elements for gender indication and the pre-filling salutation function of the add-on.

Also decreasing is the number of incorrectly chosen



Fig. 6. The language of the recipient is more often correctly assigned with the add-on.

languages by the participants. Figure 6 shows a significant drop (p = 4.347e-07) from 21 (50.0 %) to 1 (2.4 %). This difference can also be attributed to the filling in of the salutation and change of spellchecker by the add-on.

Finally the analysis of the last part of the questionnaire, shows how the test users score the add-on on several arguments between 1 and 5.

The majority of the participants (85.7 %) agree, that the "SmartMail" add-on eases their work, as they rate this statement with 4 or 5 points. Further, 71.4 % of them could imagine using the add-on on regular basis as everyone percieves the add-on as easy to use.

In the end, half of the participants prefer using Thunderbird with the "SmartMail" add-on to their own usually used email client, which can be seen in figure 7.

# **IV. CONCLUSION**

After explaining the methods we used to examine the usability study in section II and viewing the results we received from it in section III, we now draw our conclusions from them. We interpret the given answers from the questionnaire, the measured quantitative data we collected and improvements suggested by the study participants. The insights gained from this usability study helps us improve further development of the add-on.

The measured results were gathered to provide a reproducible and quantifiable metric of performance. They show, that "SmartMail", compared to Thunderbird without the add-on, really does significantly reduce the time needed for pondering over correct salutations and languages, as well as decreasing the number of falsely assigned genders and languages when writing emails to unknown recipients.

The questionnaire of the usability study further strengthens this point, as it shows, that user experience proves satisfactory and gets accepted by every test user. The participants did not

Assigned Language

19. Ich finde mein eigentliches Mail-Programm besser.
14 Antworten



Fig. 7. Final Survey questions for indicating whether the test user would use the "SmartMail" add-on on daily basis. Q19: "*I like my usual email program more*"

find any difficulties in completing the tasks and overall rate the add-on as easy to use and fast to learn. The survey presents clear ideas about usability. The positive user experience is nowadays a prerequisite for the successful implementation of the program. As can be established, the evaluations of the study identified valuable user interests and thus benefits the further development of the add-on.

The study shows that the main needs of the users, to work efficiently with the add-on, have been fulfilled. Yet, four recommendations for improvement of the program were expressed by the test participants in the questionnaire. These tips are very helpful for the project, from which the future tasks for further development can arise.

While conducting the study, a bug occurred that should be fixed in further development. Under certain circumstances after entering an email recipient in the address bar, the cursor in the text field is placed before the salutation and can not be moved. This error requires to close and reopen the mail window. As the add-on is still under development, appearing bugs are issued and handled by the developers.

One feature, requested by multiple participants, is the display of confidence values to what percentage the "SmartMail" add-on is sure of the recipient gender and language. A shown probability of the assignment processes, could increase the trust of users into the add-on even more and enhances the usability.

Another recommended feature was the option to save different templates for replying to emails before entering the contact. This could help when multiple recipients or recipients from different social circles are addressed frequently.

Additional support for other email clients, was the most common expressed request. As we already saw in the results, there is a vast and diverse landscape of email clients in use, which would potentially be improved by the features "SmartMail" hast to offer. Yet, considering the complexity and needed effort of porting the add-on to other platforms, this request is hard to tackle.

In conclusion we can say, that the "SmartMail" add-on is already a proven and very well received productivity tool, which could be even further improved by some additional features and release to more clients. Further research opportunities can be seen in the usability testing of new features or how the addon is accepted by its users in a long time, every day setting.

# APPENDIX A GATHERED RAW DATA

Participant	add-on	Correct Gender	Correct Language	Time [s]
	EALCE	TDUE	EALSE	01
	FALSE	TRUE	FALSE	01 42
	FALSE	FALSE	FALSE	42
1	TRUE	TRUE	TRUE	19
	TRUE	TRUE	TRUE	8
	TRUE	TRUE	TRUE	6
	FALSE	TRUE	TRUE	20
	FALSE	FALSE	FALSE	20
	FALSE	FALSE	FALSE	16
2	TRUE	TRUE	TRUE	11
	TRUE	TRUE	TRUE	12
	TRUE	TRUE	TRUE	8
	FALSE	TRUE	FALSE	30
	FALSE	TRUE	TRUE	21
3	FALSE	FALSE	FALSE	17
-	TRUE	TRUE	TRUE	14
	TRUE	TRUE	TRUE	10
	TRUE	IRUE	IRUE	10
	FALSE	FALSE	TRUE	34
	FALSE	TRUE	TRUE	29
4	TDUE	TRUE	TRUE	23
	TRUE	TPUE	TRUE	15
	TRUE	TRUE	TRUE	14
	EALCE	EALCE	TRUE	
	FALSE	FALSE	TRUE	3/
	FALSE	FALSE	FALSE	30
5	TRUE	TRUE	TRUE	14
	TRUE	TRUE	TRUE	15
	TRUE	TRUE	TRUE	9
	FALSE	FALSE	FALSE	18
	FALSE	FALSE	TRUE	13
6	FALSE	FALSE	FALSE	13
0	TRUE	TRUE	TRUE	10
	TRUE	TRUE	TRUE	14
	TRUE	TRUE	TRUE	8
	FALSE	FALSE	FALSE	17
	FALSE	TRUE	FALSE	20
7	FALSE	TRUE	TRUE	10
	TDUE	TRUE	TRUE	12
	TRUE	TRUE	TRUE	9
	FALSE	TRUE	FALSE	13
	FALSE	TRUE	TRUE	43 24
0	FALSE	TRUE	FALSE	24
8	TRUE	TRUE	TRUE	23
	TRUE	TRUE	FALSE	22
	TRUE	TRUE	TRUE	9
	FALSE	FALSE	TRUE	28
	FALSE	FALSE	FALSE	45
9	FALSE	FALSE	TRUE	25
-	TRUE	TRUE	TRUE	15
	TRUE	TRUE	TRUE	12
	IKUE	IKUE	IKUE	3
	FALSE	f	TRUE	48
	FALSE	FALSE	FALSE	38
10	TDUE	TDUE	TRUE	29
	TRUE	TRUE	TRUE	12
	TRUE	TRUE	TRUE	12
	EALCE	02	TDUE	75
	FALSE	TRUE	TRUE	75 49
	FALSE	FALSE	TRUE	10
11	TRUE	TRUE	TRUE	13
	TRUE	TRUE	TRUE	14
	TRUE	TRUE	TRUE	N/A

Participant	add-on	Correct Gender Correct Langua		Time [s]
	FALSE	TRUE	FALSE	39
	FALSE	TRUE	TRUE	14
12	FALSE	FALSE	TRUE	13
12	TRUE	TRUE	TRUE	12
	TRUE	TRUE	TRUE	7
	TRUE	TRUE	TRUE	6
	FALSE	TRUE	FALSE	79
	FALSE	FALSE	FALSE	45
13	FALSE	TRUE	FALSE	47
15	TRUE	TRUE	TRUE	21
	TRUE	TRUE	TRUE	12
	TRUE	TRUE	TRUE	17
	FALSE	TRUE	TRUE	76
	FALSE	TRUE	TRUE	19
1.4	FALSE	FALSE	TRUE	24
14	TRUE	TRUE	TRUE	11
	TRUE	TRUE	TRUE	10
	TRUE	TRUE	TRUE	15

# APPENDIX B QUESTIONNAIRE

1.	Bist	du	

männlich?

O weiblich?

2. Wie alt bist du?

Meine Antwort

3. Welches E-Mail Programm verwendest du?

Meine Antwort

4. Wie viele E-Mails schreibst du am Tag?

0 1-5

5-10

🔘 10 oder mehr

5. Wie viel Zeit verbringst du am Tag mit E-Mails?

Meine Antwort

6. Hast du internationale E-Mail Empfänger?

🔘 Ja

O Nein

6	

eil 2							14. Ich empfinde die Be	edienun	g als se	hr umst	ändlich	۱.	
. Ich kann mir sehr gu	t vorste	llen, da	s Syster	n regelr	näßig zu	u nutzen.		1	2	3	4	5	
	1	2	3	4	5		Stimme gar nicht zu	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	Stimme voll
imme gar nicht zu	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	Stimme voll zu							
							15. Ich habe mich bei d	ler Nutz	ung des	s Systen	ns sehr	sicher g	jefühlt.
pfinde das Sy	stem al	s unnöt	ig komp	olex.				1	2	3	4	5	
	1	2	3	4	5		Stimme gar nicht zu	0	0	0	0	0	Stimme voll
nicht zu	$\bigcirc$	0	$\bigcirc$	$\bigcirc$	$\bigcirc$	Stimme voll zu							
							16. Die Verwendung de	es Syste	ms erlei	ichtert r	mir die	Arbeit.	
pfinde das Sy	stem als	s einfac	:h zu nu	tzen.				1	2	3	4	5	
	1	2	3	4	5		Stimme gar nicht zu	$\bigcirc$	$\bigcirc$	0	0	0	Stimme voll 2
ar nicht zu	0	0	0	0	0	Stimme voll zu							
denke, dass ich en.	technis	chen S	upport	brauche	en würde	e, um das System	konnte.	1	2	3	4	5	
	1	2	3	4	5		Stimme gar nicht zu	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	Stimme voll z
ar nicht zu	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	Stimme voll zu							
							18. Was fehlt dir im Sys	tem noo	ch bzw.	gibt es	Verbes	serungs	möglichkeiten
finde, dass die v	erschie	denen l	Funktio	nen des	System	s gut integriert	Meine Antwort						
	1	2	3	4	5								
me gar nicht zu	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	Stimme voll zu	19. Ich finde mein eiger	ntliches	Mail-Pr	ogramn	n besse	er. *	
							◯ Ja ◯ Nein						
finde, dass es in	n Syster	n zu vie	ele Inkor	nsistenz	en gibt.								
	1	2	3	4	5								
ne gar nicht zu	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	Stimme voll zu							
nn mir vorstel hen lernen.	len, das	s die m	ieisten l	_eute da	as Syster	n schnell zu	Du	ММҮ	Appe nam	NDIX ES FC	C Dr te	ESTIN	G
	1	2	3	4	5								
a ar nicht su	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	Stimme voll 711	Forename Surn	ame (	Gender	Lang	guage	Email	
gar mont zu	$\bigcirc$	0	$\bigcirc$	0	$\bigcirc$	Summe von Zu	Ashanti Mue	ller f	f	Engl	lish	a.m@	byom.de

# ESTING

Forename	Surname	Gender	Language	Email
Ashanti	Mueller	f	English	a.m@byom.de
Siya	Mueller	m	German	s.m@byom.de
Qamar	Mueller	m	German	q.m@byom.de
Wafaa	Miller	f	German	w.m@byom.de
Yuval	Merk	m	German	y.m@byom.de
Prantjal	Merkel	f	German	p.m@byom.de
Nehal	Nick	f	English	n.n@byom.de
Katsumi	Koll	m	English	k.k@byom.de
Gul	Knoll	f	English	g.k@byom.de
Deniz	Mueller	f	English	d.m@byom.de
Velvel	Miller	f	German	v.m@byom.de
Bohumil	Mueller	m	English	b.m@byom.de
Seku	Claas	m	German	s.c@byom.de
Tijani	Oster	m	German	TRUE.o@byom.de
Jomo	Natanja	m	English	j.n@byom.de
Sasha	Richter	f	German	s.r@byom.de
Jamie	Takumi	m	English	j.t@byom.de

8. Ich empfinde das System als unnötig komplex. 14 Antworten







10. Ich denke, dass ich technischen Support brauchen würde, um das System zu nutzen. 14 Antworten



<sup>11.</sup> Ich finde, dass die verschiedenen Funktionen des Systems gut integriert sind. 14 Antworten



12. Ich finde, dass es im System zu viele Inkonsistenzen gibt. 13 Antworten

T



13. Ich kann mir vorstellen, dass die meisten Leute das System schnell zu beherrschen lernen. 14 Antworten





2. Wie alt bist du? 14 Antworten



3. Welches E-Mail Programm verwendest du? 14 Antworten



5. Wie viel Zeit verbringst du am Tag mit E-Mails? 14 Antworten



7. Ich kann mir sehr gut vorstellen, das System regelmäßig zu nutzen.

14 Antworten



7

### 14. Ich empfinde die Bedienung als sehr umständlich. 14 Antworten



## 15. Ich habe mich bei der Nutzung des Systems sehr sicher gefühlt. 13 Antworten



16. Die Verwendung des Systems erleichtert mir die Arbeit 14 Antworten



17. Ich musste eine Menge Dinge lernen, bevor ich mit dem System arbeiten konnte. 13 Antworten



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