



Grant Agreement No.: 761488

CPN

D4.4: Cycle 3 Piloting Report

This deliverable contains the integrated product prototypes, detailed planning of the different pilot activities and validation results for cycle 3.

Work package	WP4
Task	T4.1 – T4.4
Due date	30/04/2020
Submission date	30/04/2020
Deliverable lead	VRT
Version	1.0
Authors	Wagner, Tilman (DW); Mattheijssens, Joris (VRT); Kisselmann, Olga (DW), Van Lier, Jens (VRT); Van Buggenhout, Natasja (Imec); Wendy Van den Broeck (imec) Danezis, Christos (Dias); Konstantinou, Stavria (Dias); Lemmelijn, Ilke (VRT); Bosco Ferdinando (ENG), Fulvio D'Antonio (LVT)
Reviewers	Charalampous, Stefanos (DIAS)
Keywords	

Document Revision History

Version	Date	Description of change	List of contributor(s)
V0.1	12/03/2020	Set-up template	Lemmelijn, Ilke (VRT)
V0.2	27/04/2020	Final version for review	Wagner, Tilman (DW); Mattheijssens, Joris (VRT); Kisselmann, Olga (DW), Van Lier, Jens (VRT); Van Buggenhout, Natasja (Imec); Wendy Van den Broeck (imec) Danezis, Christos (Dias); Konstantinou, Stavria (Dias); Lemmelijn, Ilke (VRT)
V0.3	29/04/2020	Review comments included	Charalampous, Stefanos (DIAS)
V1.0	30/04/2020	Final version	Lemmelijn, Ilke (VRT)



DISCLAIMER

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 761488.

This document reflects only the authors' views and the Commission is not responsible for any use that may be made of the information it contains.

Project co-funded by the European Commission in the H2020 Programme	
Nature of the deliverable:	to specify R, DEM, DEC, OTHER*
Dissemination Level	
PU	Public, fully open, e.g. web
CL	Classified, information as referred to in Commission Decision 2001/844/EC
CO	Confidential to CPN project and Commission Services



EXECUTIVE SUMMARY

This deliverable provides an overview of the different steps that have been undertaken to improve, test and validate the CPN concept, platform and mobile application after the completion of Pilot 2. The activities include Pilot 3, which was conducted by all three media partners, as well as supplementing a professional evaluation of the producer's dashboard.

The results of Pilot 3 were definitely a great improvement over Pilot 2. In most of the different scenarios there has been a sensible increment of articles consumed (+51% for DW users and +59% for DIAS-app users by using the CPN app). In the case of VRT app there is no evidence that users getting CPN recommendations consumed more articles than users in the other groups (but it is worth to remind that the setup was different); however in VRT case other good behaviours of the CPN recommender have been demonstrated: users in the hybrid CPN recommender group read more from the personalized stream, have received articles with the highest diversity in the recommendation lists (and consequently consumed more diversely) and the CPN platform recommends slightly more articles from long-tail distribution although if the simple content-based recommender is the most successful in getting such articles actually read. The introduction of CPN services in existing websites (like in the case of DIAS) shows clearly an interest of users towards the personalized news feed indicating a great potential for the integration of such services in pre-existing apps and websites. The average consumption of articles in the CPN feed was almost double of the average consumption of articles in the website. Furthermore, in the CPN feed, users were coming back with an average of 11,4 sessions per user, when the website users had an average of 5,0 sessions per user.

Analyses of the surveys show sometimes mixed results about the opinions of the users about feeling informed and getting the right personalized content; we can attribute this phenomenon to the fact the “informedness” is a highly subjective concept and that, since there are very high expectations on an automated system that could reduce our information overload, when the recommender does not give perfect results, users feel that the system is not working properly. We remind that our system is tuned also for ensuring a diversity of the content provided and to foster in some cases “serendipitous” discoveries of new types of content that are not perfectly aligned with user profile history but could help them to get out of their comfort zone or filter bubble.

Once again, therefore, we demonstrated that it is not possible, with a single recommender, to obtain an improvement on all the desired business metrics (increased consumption, informedness feeling, diversity of content, etc.). The only possible approach, for a publisher, would be to focus on specific business objectives/trade-offs and using a system that allows for testing different system configurations to achieve the desired results.

The CPN platform offers to publishers exactly the level of control needed to address this task: it allows to define recommenders based on different techniques, combining them into an hybrid recommender, selecting the kind of user events that need to be taken into account, to test different recommenders on portions of the user base via A/B testing services) and to inspect the results in order to select the most successful one according to their own objectives.

This deliverable is the successor of D4.3.



TABLE OF CONTENTS

1	INTRODUCTION.....	12
2	CPN APPLICATION DEVELOPMENT REQUIREMENTS	13
3	SIDE TRACKS.....	38
4	PILOT 3 – END USER EVALUATION OF THE 3RD CPN PROTOTYPE	39
4.1	methodology.....	41
4.1.1	Overarching approach – user research.....	41
4.1.2	Specific research questions & approaches per media organisation	55
4.2	Participants recruitment report.....	58
4.2.1	Open Pilot / DW.....	58
4.2.2	VRT.....	59
4.2.3	DIAS	60
4.3	Evaluation results.....	62
4.3.1	VRT.....	62
4.3.2	Open Pilot / DW.....	84
4.3.3	DIAS	116
5	EVALUATION OF THE PRODUCER’S DASHBOARD BY PROFESSIONAL USERS 172	
5.1	Methodology	172
5.2	Evaluation by media companies in the cpn consortium.....	173
5.2.1	VRT.....	173
5.2.2	DW	175
5.2.3	DIAS	178
5.3	Evaluation by SMEs: loomi	181
5.4	Conclusions.....	181
6	PILOT 3 – OVERALL CONCLUSIONS	184
7	APPENDIX A: CPN PRODUCT BOARD FLYER.....	185
8	APPENDIX B: BACKGROUND PROFILE OF THE PRODUCER’S DASHBOARD EVALUATION INTERVIEWEES (PROFESSIONAL USERS)	187
9	APPENDIX C: VRT MYNWS WEEKLY QUIZZES	189



LIST OF FIGURES

FIGURE 1: OVERVIEW OF PROJECT TIME PLAN WITH REGARDS TO PILOT EVALUATIONS	39
FIGURE 2: SCREENSHOT CPN APP - DW	42
FIGURE 3: SCREENSHOT OF THE CPN APP	43
FIGURE 4: SCREENSHOT OF THE IMPLEMENTATION OF PERSONALISATION ON SIGMALIVE.COM	43
FIGURE 5: SCREENSHOT OF THE IMPLEMENTATION OF PERSONALISATION ON CITY.COM.CY	44
FIGURE 6: SCREENSHOT OF THE VRT MYNWS APP	44
FIGURE 7: SCREENSHOT VRT NWS ARTICLE	60
FIGURE 8: SCREENSHOT VRT PILOOTZONE	60
FIGURE 9: DAILY EVENTS PER GROUP (VRT)	62
FIGURE 10: NUMBER OF READS OF THE ARTICLES ON VRTNWS, THAT WERE PUBLISHED & READ FEBRUARY 17, 2020	65
FIGURE 11: ENTROPY OF RECOMMENDATION LISTS AND USER SELECTIONS, VRT MYNWS	66
FIGURE 12: MEAN SUBJECTIVE FEELING OF INFORMEDNESS OVER THE 4 WEEKS WITH SE AS ERROR BARS	71
FIGURE 13: MEAN OBJECTIVE MEASURE OF INFORMEDNESS OVER THE 4 WEEKS	72
FIGURE 14: BELIEF OF MISSING OUT PER WEEK AND PER GROUP	74
FIGURE 15: FEAR OF MISSING OUT PER WEEK AND PER GROUP	74
FIGURE 16: EXPERIENCE OF FILTER BUBBLE PER WEEK AND PER GROUP	76
FIGURE 17: SURPRISE OF ITEMS IN MY NWS TAB	77
FIGURE 18: WHY ARE USERS DROPPING OUT?	79
FIGURE 19: DW RESPONDENTS' SUBJECTIVE FEELING OF BEING INFORMED (PERSONALISED VS CONTROL GROUP) - FIRST WEEKLY SURVEY RESULTS	86
FIGURE 20: DW RESPONDENTS' SATISFACTION OF THEIR NEED FOR NEWS (PERSONALISED VS CONTROL GROUP) - WEEKLY SURVEY 1 RESULTS	87
FIGURE 21: DW RESPONDENTS' EXPERIENCE OF FEAR OF MISSING OUT (PERSONALISED GROUP)	88
FIGURE 22: DW RESPONDENTS' EXPERIENCE OF FEAR OF MISSING OUT (CONTROL GROUP)	89
FIGURE 23: DW RESPONDENTS' PERCEPTION OF FILTER BUBBLE (PERSONALISED GROUP)	90
FIGURE 24: DW RESPONDENTS' PERCEPTION OF FILTER BUBBLE (PERSONALISED GROUP)	91
FIGURE 25: DIVERSITY AND SUBJECTIVE FEELING OF BEING SURPRISED (DW RESPONDENTS – PERSONALISED GROUP)	92



FIGURE 26: SUBJECTIVE FEELING OF BEING SURPRISED AND FULFILMENT OF EXPECTATIONS (DW RESPONDENTS PERSONALISED GROUP) 93

FIGURE 27: DIVERSITY AND SUBJECTIVE FEELING OF BEING SURPRISED (DW RESPONDENTS – CONTROL GROUP)..... 94

FIGURE 28: SUBJECTIVE FEELING OF BEING SURPRISED AND FULFILMENT OF EXPECTATIONS (DW RESPONDENTS PERSONALISED GROUP) 94

FIGURE 29: DW RESPONDENTS EXPERIENCE OF PERSONALISATION (PERSONALISED GROUP)..... 95

FIGURE 30: DW RESPONDENTS EXPERIENCE OF PERSONALISATION (CONTROL GROUP)..... 96

FIGURE 31: DW RESPONDENTS’ SATISFACTION WITH THE PERSONALISED NEWS OFFER (PERSONALISED GROUP) 97

FIGURE 32: DW RESPONDENTS’ SATISFACTION WITH THE PERSONALISED NEWS OFFER (PERSONALISED GROUP) 98

FIGURE 33: DW RESPONDENTS’ EVALUATION OF THE PERSONAL DATA RECEIPT 99

FIGURE 34: DW RESPONDENTS’ SATISFACTION WITH THE RELEVANCE OF THE INDIVIDUAL NEWS STREAM..... 101

FIGURE 35: DW RESPONDENTS’ ATTITUDE TOWARDS NEWS PERSONALISATION 102

FIGURE 36: DW RESPONDENTS’ FEAR OF MISSING OUT 103

FIGURE 37: DW RESPONDENTS’ PERCEPTION OF FILTER BUBBLE..... 104

FIGURE 38: DIVERSITY AND SUBJECTIVE FEELING OF BEING SURPRISED (DW RESPONDENTS)..... 105

FIGURE 39: SUBJECTIVE FEELING OF BEING SURPRISED AND THE FULFILMENT OF EXPECTATIONS 106

FIGURE 40: DW RESPONDENTS’ EXPERIENCE OF PERSONALISATION..... 107

FIGURE 41: DW RESPONDENTS’ SATISFACTION WITH THE APP IN GENERAL 108

FIGURE 42: DW RESPONDENTS’ SATISFACTION WITH THE PERSONALISED NEWS OFFER 109

FIGURE 43: DW RESPONDENTS’ EVALUATION OF THE USER-FRIENDLINESS, EASE OF USE, ARRANGEMENT, AND VISUAL ATTRACTIVENESS OF THE APP 110

FIGURE 44: DW RESPONDENTS’ ATTITUDE TOWARDS USING THE CPN APP IN THE FUTURE 111

FIGURE 45: DW RESPONDENTS’ WILLINGNESS TO RECOMMEND THE CPN APP TO A COLLEAGUE OR FRIEND 112

FIGURE 46: MAIN REASONS OF DW RESPONDENTS FOR NOT CONTINUING TO TEST THE APP 113

FIGURE 47: NEW USERS LOGGED IN FROM 3/2/2020 TO 04/03/2020 120

FIGURE 48: DIAS (WEBSITE) RESPONDENTS SUBJECTIVE FEELING OF BEING INFORMED DURING THE WEEKLY SURVEYS 121

FIGURE 49: DIAS (WEBSITE) RESPONDENTS’ SATISFACTION OF THE NEED FOR NEWS AFTER READING ‘MY NEWS’ (PERSONALISED GROUP)..... 122

FIGURE 50: DIAS (WEBSITE) RESPONDENTS’ FEAR OF MISSING OUT 123



FIGURE 51: DIAS (WEBSITE) RESPONDENTS’ PERCEPTION OF FILTER BUBBLE 124

FIGURE 52: DIAS (WEBSITE) RESPONDENTS’ EVALUATION OF THE DIVERSITY OF THE NEWS OFFER AND THE SUBJECTIVE FEELING OF BEING SURPRISED (COMBINED RESULT OF THE FOUR WEEKLY SURVEYS)..... 125

FIGURE 53: DIAS (WEBSITE) RESPONDENTS’ EVALUATION OF THE SUBJECTIVE FEELING OF BEING SURPRISED AND THE FULFILMENT OF EXPECTATIONS 126

FIGURE 54: DIAS WEBSITE-APPLICATION RESPONDENTS’ EXPERIENCE OF PERSONALISATION (COMBINED RESULT OF THE FOUR WEEKLY SURVEYS)..... 127

FIGURE 55: DIAS (WEBSITE) RESPONDENTS’ SATISFACTION WITH THE PERSONALISED NEWS OFFER (COMBINED RESULTS OF THE FOUR WEEKLY SURVEYS)..... 128

FIGURE 56: DIAS WEBSITE-APPLICATION RESPONDENTS’ EVALUATION OF THE PERSONAL DATA RECEIPT 129

FIGURE 57: DIAS WEBSITE-APPLICATION RESPONDENTS’ SATISFACTION WITH THE ‘MY NEWS’ SERVICE IN GENERAL 130

FIGURE 58: DIAS WEBSITE-APPLICATION RESPONDENTS’ SATISFACTION WITH THE PERSONALISED NEWS ARTICLES IN THE ‘MY NEWS’ SERVICE..... 131

FIGURE 59: DIAS WEBSITE-APPLICATION RESPONDENTS’ ATTITUDE TOWARDS NEWS PERSONALISATION..... 132

FIGURE 60: DIAS WEBSITE-APPLICATION RESPONDENTS’ FEAR OF MISSING OUT 133

FIGURE 61: DIAS (WEBSITE) RESPONDENTS’ EXPERIENCE OF FILTER BUBBLE 134

FIGURE 62: DIAS WEBSITE-APPLICATION RESPONDENTS’ EXPERIENCE OF THE NEWS OFFER IN TERMS OF DIVERSITY AND THE SUBJECTIVE FEELING OF BEING SURPRISED (PERSONALISED GROUP) 135

FIGURE 63: DIAS WEBSITE-APPLICATION RESPONDENTS’ SUBJECTIVE FEELING OF BEING SURPRISED AND THE FULFILMENT OF EXPECTATIONS (PERSONALISED GROUP)..... 136

FIGURE 64: DIAS WEBSITE-APPLICATION RESPONDENTS’ EXPERIENCE OF PERSONALISATION (PERSONALISED GROUP) 137

FIGURE 65: DIAS WEBSITE-APPLICATION RESPONDENTS’ EVALUATION OF THE USER FRIENDLINESS, EASE OF USE, ARRANGEMENT AND VISUAL ATTRACTIVENESS OF THE ‘MY NEWS’ SERVICE (PERSONALISED GROUP) 138

FIGURE 66: DIAS WEBSITE-APPLICATION RESPONDENTS’ ATTITUDE TOWARDS USING THE CPN APP IN THE FUTURE (PERSONALISED GROUP)..... 139

FIGURE 67: DIAS WEBSITE-APPLICATION RESPONDENTS’ WILLINGNESS TO RECOMMEND THE ‘MY NEWS’ SERVICE TO A COLLEAGUE OR FRIEND (PERSONALISED GROUP) 140

FIGURE 68: DIAS (CPN-APP) RESPONDENTS’ FEAR OF MISSING OUT 142

FIGURE 69: DIAS (CPN-APP) RESPONDENTS’ PERCEPTION OF FILTER BUBBLE..... 143

FIGURE 70: DIAS (CPN-APP) RESPONDENTS’ EVALUATION OF THE DIVERSITY OF THE NEWS OFFER AND THE SUBJECTIVE FEELING OF BEING SURPRISED..... 144

FIGURE 71: DIAS (CPN-APP) RESPONDENTS’ SUBJECTIVE FEELING OF BEING SURPRISED AND THE FULFILMENT OF EXPECTATIONS 145

FIGURE 72: DIAS (CPN-APP) RESPONDENTS’ EXPERIENCE OF PERSONALISATION IN THE ‘MY NEWS’ TAB..... 146

FIGURE 73: DIAS (CPN-APP) RESPONDENTS’ SATISFACTION WITH THE PERSONALISED NEWS OFFER 147

FIGURE 74: DIAS (CPN-APP) RESPONDENTS’ EVALUATION OF THE PERSONAL DATA RECEIPT 148

FIGURE 75: DIAS (CPN-APP) RESPONDENT’S SATISFACTION WITH THE RELEVANCE OF INDIVIDUAL NEWS STREAMS..... 150

FIGURE 76: DIAS (CPN-APP) RESPONDENTS’ ATTITUDE TOWARDS NEWS PERSONALISATION..... 151

FIGURE 77: DIAS (CPN-APP) RESPONDENTS’ FEAR OF MISSING OUT 152

FIGURE 78: DIAS (CPN-APP) RESPONDENTS’ EXPERIENCE OF FILTER BUBBLE..... 153

FIGURE 79: DIAS (CPN-APP) RESPONDENTS’ EXPERIENCE OF THE NEWS OFFER IN TERMS OF DIVERSITY AND THE SUBJECTIVE FEELING OF BEING SURPRISED..... 154

FIGURE 80: DIAS (CPN-APP) RESPONDENTS’ SUBJECTIVE FEELING OF BEING SURPRISED AND THEIR FULFILMENT OF NEWS EXPECTATIONS..... 155

FIGURE 81: DIAS (CPN-APP) RESPONDENTS’ EXPERIENCE OF PERSONALISATION 156

FIGURE 82: DIAS (CPN-APP) RESPONDENTS’ SATISFACTION WITH THE APP IN GENERAL..... 157

FIGURE 83: DIAS (CPN-APP) RESPONDENTS’ SATISFACTION WITH THE PERSONALISED NEWS OFFER 158

FIGURE 84: DIAS (CPN-APP) RESPONDENTS’ EVALUATION OF THE USER FRIENDLINESS, EASE OF USE, ARRANGEMENT AND VISUAL ATTRACTIVENESS OF THE CPN-APP 159

FIGURE 85: DIAS (CPN-APP) RESPONDENTS’ ATTITUDE TOWARDS USING THE CPN APP IN THE FUTURE 160

FIGURE 86: DIAS (CPN-APP) RESPONDENTS’ WILLINGNESS TO RECOMMEND THE APP TO A COLLEAGUE OR FRIEND..... 161

FIGURE 87: MAIN REASONS OF THE DIAS RESPONDENTS FOR NOT CONTINUING TO TEST THE CPN-APP 162

LIST OF TABLES

TABLE 1: CPN REQUIREMENTS OVERVIEW	13
TABLE 2: LOGGING DATA	45
TABLE 3: SET-UP AND DISTRIBUTION OF THE USER SURVEYS PER MEDIA ORGANISATION.....	46
TABLE 4: USER SURVEY ITEMS AND MEASUREMENTS	47
TABLE 5: PARTICIPATION NUMBERS OF THE USER SURVEYS PER MEDIA ORGANISATION.....	54
TABLE 6: USER GROUPS VRT PILOT (ACTIVE USERS ONLY)	55
TABLE 7: SOCIODEMOGRAPHIC OVERVIEW OF THE REGISTERED USER FOR THE VRT PILOT	55
TABLE 8: ENTROPY OF RECOMMENDATION LISTS AND USER SELECTIONS, VRT MYNWS.....	65
TABLE 9: RESULTS OF USER BEHAVIOUR ANALYSIS, VRT MYNWS.....	66
TABLE 10: BEHAVIOURAL DATA DW	85
TABLE 11: SOCIODEMOGRAPHIC DATA OF THE DW WEEKLY SURVEY RESPONDENTS.....	85
TABLE 12: BEHAVIOURAL DATA DIAS.....	116
TABLE 13: AGGREGATED DATA FOR DIAS & DW	117
TABLE 14: USAGE OF WEBSITE FROM 3/2/2020 TO 9/3/2020	118
TABLE 15: TIME SPENT COMPARISON	119
TABLE 16: SOCIODEMOGRAPHIC DATA OF THE DIAS WEBSITE-APPLICATION WEEKLY SURVEY RESPONDENTS	121
TABLE 17: SOCIODEMOGRAPHIC DATA OF THE DIAS (CPN-APP) WEEKLY SURVEY RESPONDENTS.....	141
TABLE 18: OVERVIEW OF THE NUMBER OF INTERVIEWEES FOR THE EVALUATION OF THE PRODUCER'S DASHBOARD PER MEDIA PARTNER AND PILOT COUNTRY.....	173
TABLE 19: EVALUATION OF THE DASHBOARD ELEMENTS AND USE BY VRT JOURNALISTS.....	173
TABLE 20: EVALUATION OF THE DASHBOARD ELEMENTS BY DIAS PROFESSIONALS	178



ABBREVIATIONS

WP	Work Package
DW	Deutsche Welle
VRT	Vlaamse Radio- en Televisieomroeporganisatie
FOMO	Fear of missing out
Avg	Average



1 INTRODUCTION

The focus of this deliverable is to report on the third (& final) CPN pilot. The pilot encompasses the development of the third version of the CPN prototype, including the evaluation of the final prototype in a large-scale open pilot setup as described in D4.3 Cycle 2 piloting report.

The deliverable structure follows the idea of briefly explaining the connections with other (technical) developments and documents and the overall requirements scheme to clarify what requirements have been added in the third pilot (chapter 2).

Following is a reference to the side tracks that were done for pilot 2 (chapter 3).

All previous steps lead to the Pilot 3 end user evaluation of the third prototype (chapter 4). First the methodology is explained, then diving into the recruitment process of the participants. After that, the results from the actual piloting are displayed and explained in detail. The chapter concludes with the main findings of the Pilot 3.

Finally, the evaluation of the producer's dashboard by professional users is tackled (chapter 5). Firstly, the results of the dashboard by the three media companies in the consortium is shared, and after that, also the evaluation results of one external SME (Loomi) are provided.

The deliverable closes with a summary of the overall findings & learnings (chapter 6). It can be concluded that the consortium managed to create a recommender that works, and that provided interesting learnings for future developments.



2 CPN APPLICATION DEVELOPMENT REQUIREMENTS

In the first phase of the CPN project, a list of user requirements was compiled together with users and relevant stakeholders. These requirements have steered the development process since the start of the process. The table below shows the overview and the final status of these requirements.

Table 1: CPN Requirements Overview

User Profile			
ID	Requirements	Status	Note
UR-UP1 - Interests (Categories, Entities, and Values): What topics is the user interested in?			
UR-UP1.1	The system must allow the users to manually choose their interests that later define the personalisation	Discarded	It was decided that the cold start problem will be resolved by quickly learning from the first user actions.
UR-UP1.2	The system should create/refine interests based on the user's consumption habits	Completed	
UR-UP1.3	The system should be able to offer personalised content based on the users' mood or values	Partially Completed	Uplifting/Depressing classification is available but user mood will be tested as experimental in the third pilot



<p>UR-UP1.4</p>	<p>The system should refine the user’s interests through frequent interaction with the user (talkback)</p>	<p>Completed</p>	
<p>UR-UP1.5</p>	<p>The system should refine the interests based on the user’s behaviour on social networks (through data upload or connection of the networks)</p>	<p>Completed</p>	
<p>UR-UP1.6</p>	<p>The system should assign preferences (1-5) to categories based on the users’ behaviour</p>	<p>Completed</p>	
<p>UR-UP1.7</p>	<p>The system should allow users to assign and change preferences (1-5) to categories themselves</p>	<p>Discarded</p>	<p>This is incompatible with the requirements of automatic user profiling and the fact that the categories are automatically defined in a dynamic fashion</p>
<p>UR-UP1.8</p>	<p>The system must allow users to completely turn off the personalisation algorithm and receive content as is and v.v.</p>	<p>Completed</p>	



UR-UP2 - Network: Making use of connections the user already has through social media			
UR-UP2.1	The system should allow for social media integration to recommend content based on what connections like, read and share	Completed	
UR-UP2.2	The system should offer a recommendation of articles based on most liked/most shared numbers from a user's network and beyond that. (Nuzzle-Feature)	Completed	
UR-UP2.3	The system should allow for social media integration to keep track of what the user has already seen elsewhere.	Completed	



UR-UP2.4	The system should be able to analyse whom a user has been most interacting with on social media to prioritize the users for the personalisation	Completed	
UR-UP2.5	The system should allow the user to down-/upload their network connections through a user account.	Discarded	Social media login will be integrated on pilot 3 but the Facebook API poses restrictions. We do not have access to respective data, apart from Twitter
[1] [2] [3] [4] [5] UR-UP2.6	The system should allow users to search for other users on social media to build direct connections	Discarded	Social media login will be integrated on pilot 3 but the Facebook API poses restrictions. We do not have access to respective data, apart from Twitter[6] [7] [8] [9] [10]
UR-UP2.7	The system should allow users to share content from the CPN system to social networks	Completed	
UR-UP3 - Time & Length: When does the user prefer to consume content and for how long?			



<p>UR-UP3.1</p>	<p>The system must allow the user to choose a preferred time frame or frames to consume content</p>	<p>Completed</p>	
<p>UR-UP3.2</p>	<p>The system should create/refine time frames based on the user's consumption habits</p>	<p>Completed</p>	
<p>UR-UP3.3</p>	<p>The system should refine the user's time frames through frequent interaction with the user (talkback)</p>	<p>Completed</p>	
<p>UR-UP3.4</p>	<p>The system should use the time frames in order to decide how many items of what length and of what format it offers to the user</p>	<p>Completed</p>	
<p>UR-UP3.5</p>	<p>The system must allow the user to postpone a time frame for a chosen amount of time.</p>	<p>Completed</p>	



<p>UR-UP3.6</p>	<p>The system must allow the user to ignore a time frame completely</p>	<p>Completed</p>	
<p>UR-UP3.7</p>	<p>The system should learn from these user responses and adjust its offerings accordingly</p>	<p>Discarded</p>	<p>We have decided to drop this requirement after scoring it by means of RICE methodology (Reach, Impact, Confidence, Effort). The time-frame functionality was used by very few users during Pilot 2. Implementing this requirement implies to setup a complex inference time-frame procedure that will result in:</p> <ol style="list-style-type: none"> 1. Limited Reach (almost no users in Pilot 2 used timeframes) 2. Questionable Impact (If the system autonomously update preferred time frames could likely annoy the user) 3. Confidence and Effort: the confidence of implementing a time-frame inference engine with a limited number of users is very low and it would require a significant effort.

UR-UP4 - Preferred Media: Which type of content does the user prefer?			
UR-UP4.1	The system must allow the user to choose preferred types of content	Discarded	Having different media types has been evaluated too technically complicated, so we decided to focus on the text first.
UR-UP4.2	The system should set/refine preferred types of content based on the user's consumption habits and the timing	Discarded	
UR-UP4.3	The system should refine the user's preferred types of content through frequent interaction with the user (talkback)	Discarded	
UR-UP5 - Location & Surroundings: Where is the user and what's going on around him/her?			
UR-UP5.1	The system should make use of the location data of the user (permission of the user granted) to choose the right content for the user	Completed	



UR-UP5.2	The system should allow the user to set a home/main interest location	Completed	
UR-UP5.3	The system should make use of the location data of the user to determine the best point in time to offer content	Completed	This functionality is implemented using a filter that, given location data, distinguishes the results of the recommender system based on the user position.
UR-UP5.4	The system should try to determine the surroundings of the user based on either just location data or location data and direct interaction with the user (talkback)	Completed	A function has been implemented, which adds other contents based only on location data or both location data and user's direct indications to the results of the recommender. In order to have a more customized result, the added contents are compared with the contents provided by the recommender and if there are similarities the content is added to the suggestion.
UR-UP5.5	The system must give the user an easy option to agree to or withdraw from using location data for personalised offers	Completed	



UR-UP6 - Knowledge (Management): What does the user already know?			
UR-UP6.1	The system must keep track of what content the user has already consumed on a piece and on a content basis within CPN and beyond	Partially Completed	<p>We track only specific actions: Article Opened, Scrolled Down, Interesting.</p> <p>We are investigating to include a new action: the time spent by the user over a specific time threshold.</p> <p>We are not able to identify where they stopped, while reading an article</p>
UR-UP6.2	The system must keep track of how much of each item users consume, where they stop, continue and what they skip	Partially Completed	
UR-UP6.3	The system should interact with the user in order to refine user interests in regards to why something was skipped or something was consumed completely	Completed	

<p>UR-UP6.4</p>	<p>The system should be able to offer insights and advice based on what it learned about what a user consumed concerning a certain entity (e.g. a place)</p>	<p>Completed</p>	
<p>UR-UP6.5</p>	<p>The system should allow the user to delete part of the system's knowledge for specific time frames back in time from the moment of viewing</p>	<p>Completed</p>	
<p>UR-UP7 - Devices: On what device is the user consuming content?</p>			
<p>UR-UP7.1</p>	<p>The system should check on what device the user is consuming the content</p>	<p>Completed</p>	



<p>UR-UP7.2</p>	<p>The system should adjust its content offering based on the type of device the user is using</p>	<p>Partially Completed</p>	<p>The device of the user is tracked and contents will be presented differently based on the device used (responsiveness). Not enough technical resources & capabilities available to go deeper in detail within this requirement (also impact on work for media companies).</p>
<p>UR-UP7.3</p>	<p>The system should try to make smart use of device data to determine the surroundings of the user and adjust the content strategy accordingly</p>	<p>Discarded</p>	<p>Using the device's sensor is out of scope</p>
<p>UR-UP8 - Importance for user: What is relevant for the user, outside their given interests?</p>			
<p>UR-UP8.1</p>	<p>The system should combine reading habits and knowledge about the user to provide smart updates on things the user could be interested in, even if this doesn't fit his/her set interests</p>	<p>Discarded</p>	<p>This user requirement has been discarded due to the lack of data collected about the users to enrich their profiling. Social media networks become huge private marketplaces and only twitter continues to be open and transparent.</p>



UR-UP8.2	The system should always offer content that has a direct influence on the users (e.g. life-threatening), overruling other interest settings	Completed	
UR-UP8.3	The system should be able to surprise the user with content, he/she would not have chosen themselves	Completed	
UR-UP9 - User Profile Management: Giving the user transparency and control over their Data			
UR-UP9.1	The system must provide transparent, simple and easy-to-understand information on what user data are collected, for what purpose and how they are stored	Completed	



UR-UP9.2	The system should require informed and explicit consent for processing personal user data, beyond those required for the provisioning of the agreed service	Completed	
UR-UP9.3	The system must give the user a full overview of his/her data and allow them full control, including update and removal of data	Completed	
UR-UP9.4	The user must be able to change and overwrite settings in their profile	Completed	
UR-UP9.5	The user must be able to download their profile data in CPN in a machine readable format and a user friendly format	Completed	



UR-UP9.6	The system should allow the user to add external data to update their profile	Completed	
Application features			
ID	Requirements		
UR-AF1 - Bursting the Filter Bubble: How can CPN avoid filter bubbles and echo chambers?			
UR-AF1.1	The system should offer users an overview of other sources, covering the same topic	Discarded	This was deemed unnecessary as every user is attached to a single source
UR-AF1.2	The system should highlight differences between the perspectives of different sources on a similar topic	Discarded	Stance detection was abandoned as its benefits were deemed questionable in content originating from mainstream sources
UR-AF1.3	The system should offer the user an easy overview of what content from which sources he has consumed over a certain period of time	Discarded	This was deemed unnecessary as every user is attached to a single source



UR-AF1.4	The system should make it easy for the user to see the bias of a content item or source	Discarded	
UR-AF1.5	The system should allow users to choose favorite sources	Discarded	This was deemed unnecessary as every user is attached to a single source
UR-AF1.6	The system should offer the user a random news selection upon request based on certain data and preferences of the users profile, which the user can choose	Completed	
UR-AF2 - Avoiding FOMO: How to ensure people think they know everything there is to know?			
UR-AF2.1	The system should show users who else from their network has consumed the same content item.	Completed	<p>Not linked to a network, it shows how many users read the article.</p> <p>We don't have the possibility to create a user's network.</p>



UR-AF2.2	The system should show users what else their network has shown, if there are differences	Completed	Not linked to a network, it shows “other users found interesting” We don’t have the possibility to create a user’s network.
UR-AF2.3	The system should be able to show users the content item from another user (anonymously)	Completed	
UR-AF2.4	The system should show users only a limited number of items at once	Completed	
UR-AF2.5	Once all articles proposed have been consumed, the system should only offer more content upon request by the users	Completed	
UR-AF3 - Content/Format: In which way do we have to prepare content for the user?			
UR-AF3.1	The system should offer content items in small, easy to consume and logical packages, allowing the user to consume them bit by bit	Discarded	Was implemented by tracking the percentage of the article that was displayed by the reader



UR-AF3.2	The system should offer the user a short overview of all important headlines at a specific point in time with access to more details upon request	Completed	
UR-AF3.3	The system should allow users to choose whether they prefer an overview or all content at once	Discarded	It was deemed unnecessary as a short summary is usually contained in the first paragraph of a news item
UR-AF3.4	The system should be able to offer both news content and entertainment	Discarded	Having different media types has been evaluated too technically complicated, so we decided to focus on the text first.
UR-AF3.5	The system should be able to offer both locally and globally relevant content	Discarded	This was deemed unnecessary as every user is attached to a single source
UR-AF3.6	The system should be able to put global news in a local relevance context for users	Discarded	It was deemed impossible to satisfy as there was no relevant brick or technology expertise on the consortium to tackle this adequately



UR-AF3.7	The system should be able to give the user a timeline overview of events regarding a specific topic	Discarded	This requirement was discarded due to prioritization of the requirements after Pilot 2 execution. Users tended to use time related functionalities very little so we focused on requirements more relevant to end users.
UR-AF3.8	The system should allow users to filter content by language	Discarded	This was deemed unnecessary as content in CPN is in particular languages for particular users
UR-AF3.9	The system should allow users to filter content by complexity within a language	Discarded	It was deemed impossible to satisfy as there was no relevant brick or technology expertise on the consortium to tackle this adequately
UR-AF4 - Sources: Where does the necessary content come from?			
UR-AF4.1	The system should be able to personalise news from/for the CPN media partners (VRT, DIAS, DW)	Completed	



UR-AF4.2	The system should allow for additional content sources, outside the consortium	Discarded	In the decided implementation the platform allows a single source for every user, so this is not possible
UR-AF5 - Transparency: Giving the user control & understanding over the content he sees.			
UR-AF5.1	The system must offer the user an easy to access and easy to understand overview of their profile	Completed	
UR-AF5.2	The system must offer users easy access to their profile in order to change settings and data	Completed	
UR-AF5.3	The system must make it transparent to the users why they are shown certain content, based on an item level	Completed	
UR-AF6 - Archive: Making content available beyond the moment			
UR-AF6.1	The system must allow users to access content again that they have already opened before	Completed	



UR-AF6.2	The system should allow users to consume content beyond their predefined time frame after an interaction with the user (talkback)	Partially Completed	Given indications provided by the user (talkback), the system provides content not only from the recommender predictions, it also adds similar contents related to a time-frame specified by the user.
UR-AF6.3	The system should allow users to actively save articles for later consumption	Completed	
UR-AF6.4	The system should be able to memorize where a user left off and restart at the same point	Completed	It is implemented when the user is Account Page, Activity, Irrelevant, Interesting. When he or she leaves the app, being on a specific article, he returns again there.
UR-AF7 - User Feedback: Asking users to help improve the system			
UR-AF7.1	The system should offer user feedback requests in a playful/entertaining way	Completed	



UR-AF7.2	The system should include guided feedback for specific elements of the system, allowing users to (help) improve it	Completed	
UR-AF7.3	The system should allow users to assign both existing or new attributes (categories, moods etc.) to a content item	Discarded	
UR-AF7.4	The system should be able to offer a feedback interaction to determine the ground level of personalisation based on mood, time and interest	Completed	
UR-AF8 - Temporary Categories: Users can temporarily change the personalisation algorithm			
UR-AF8.1	The system should allow users to search for specific topics they are temporarily interested in	Completed	
UR-AF8.2	The system should allow users to add this search as a temporary personalisation category	Completed	
UR-AF8.3	The system should allow users to define a specific time frame for this temporary change	Completed	



UR-AF9 - Mute topics: Exclude topics from the personalisation for a certain time			
UR-AF9.1	The system should allow users to define keywords and logical combinations of them to exclude content from their personalisation	Partially Completed	Implemented only with keywords and not with logical combination
UR-AF9.2	The system should allow users to define a time frame per keyword/logical combination	Partially Completed	Implemented only with keywords and not with logical combination
UR-AF9.3	The system should be able to overwrite this exclusion for important breaking rules	Completed	
Production side			
ID	Requirements		
UR-PS1 - Detailed Analytics: Giving newsrooms a more detailed feedback on their audience			
UR-PS1.1	The system should show the access to items through users by numbers (who, when, how long)	Completed	



UR-PS1.2	The system should show which parts (paragraphs, entities) of an item were most interesting to users	Discarded	This was dealt with by monitoring what percentage of the article was consumed. It isn't technically possible (in the context of CPN project) to identify a specific part of a read article
UR-PS1.3	The system should show which topics were most interesting to users	Completed	
UR-PS1.4	The system should be able to show these numbers during the creation process of the content	Completed	
UR-PS2 - Integration: How should CPN be connected to the production side?			
UR-PS2.1	The system should allow for easy integration into the producer's workflow	Completed	
UR-PS2.2	The system should provide contract templates to allow freelancers to easily work together and with editors, to define and track the scope of individual contributions and expected revenues	Completed	
UR-PS2.3	The system should allow producers to transparently see how often their contributions are used and distributed to readers	Completed	



UR-PS2.4	The system should allow producers to export the record of their publications through standardized and interoperable formats	Completed	
UR-PS2.5	The system should allow for an easy contribution of content from different publishers through standardised interfaces	Discarded	In agreement with user media partners, content editing within the dashboard is no longer expected. They prefer to have control over the editing in their environment
UR-PS2.6	The system should give feedback on what attributes are best used on content to improve the personalisation performance	Discarded	A section in the dashboard monitors performance of articles but it was found impossible to link this to specific attributes
UR-PS2.7	The system should allow editors to easily add missing attributes to articles manually	Discarded	In agreement with user media partners, content editing within the dashboard is no longer expected. They prefer to have control over the editing in their environment

During the second review meeting, it has been decided to take a step back from this extensive user requirement list and to focus on the most important services for the remaining part of the project.

Together with the reviewers, we decided to focus on the following technical topics before pilot 3:

- Improving recommendation performance
 - Recommender: offline & online evaluation
 - Offline evaluation is an indication of how the recommenders will perform on historical data.
 - Online evaluation (mini pilots)



- Enable transparency?
- Metadata extraction components (entities):
 - Fine-grained entity and relationship extraction: performance on offline datasets; how much they help the recommender (offline and online evaluation mini pilots)
 - Evaluation of uplifting depressing classifier → to investigate usefulness with users and impact on recommendation
- Specific measures for FOMO (e.g. time well-spent?) – Analytics
- Integration services of SMEs in Pilot 3
- Front end & other modules
 - Distribution Framework: integration in the CPN platform
 - CPN app development:
 - Facebook login
 - in-app services
 - UX&UI improvements
 - Alexa skill & voice commands
 - Scroll down event
 - Specific measures for FOMO (e.g. time well-spent?) – UX

These services have been explained in the technical deliverables and will be elaborated upon in the final review report (D6.6).



3 SIDE TRACKS

In pilot 2, we reported on two side tracks. A first side track was the VRT NWS app, a second side track was the smart TV integration by DW.

In pilot 3, the **VRT NWS app** was integrated as the dedicated app offering personalised VRT-content in Dutch. The further development and evaluation of this app is therefore completely integrated in the pilot 3 reporting in section 5.

The idea behind the **Smart TV integration** was to expand the existing DW app with a new element: A row of personalised video offers based on the CPN recommendation engine. Concept and integration work was started early in the second year. But the development process was continuously slowed down by several factors. Communication between DW developers and LiveTech, as the relevant technical CPN partner, proved complicated at times. And in house development at DW forced developers to prioritize their work to the disadvantage of the SmartTV implementation. Eventually the implementation had to be stopped and terminated completely, due to many other tasks and DW priorities in relation to the Corona-Pandemic.



4 PILOT 3 – END USER EVALUATION OF THE 3RD CPN PROTOTYPE

Within CPN, our aim was “to iteratively test and validate the solution in (near-to) operational real-life environments with different international audiences by implementing large-scale pilots” (CPN proposal, p. 5).

To achieve this, we applied a co-creation process in which end-users and relevant stakeholders were involved in the iterative development and testing of the CPN solution. Three pilot phases were planned and executed, here we will report on the third and final pilot phase. Characterising the third and final pilot is its openness, as we applied an open living lab design, inviting as many users as possible to test our developed prototypes.

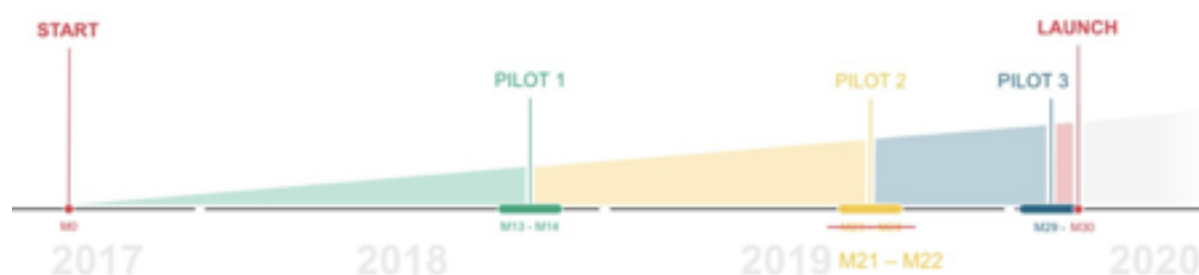


Figure 1: Overview of project time plan with regards to pilot evaluations

The originally planned user involvement in the different pilot phases is shown below (see table x). As mentioned in D4.3., we didn’t reach the foreseen target in pilot 2 due to different reasons. Among them were issues with technical requirements to test the app (Android only), the test period and expected commitments of users (4 weeks of intense usage) and the fact that the recommender wasn’t functioning as expected. The approach in the third pilot phase was hence widened, using an open pilot approach and focusing more on core audiences through additional testing setups. The fixed timing to participate was dropped and no required length of participation, nor an obligation to give feedback, also lowered the barrier for people to continuously test the application. The consortium members also focused on additional means to gather additional testers (e.g. social media ads), which led to an increase in participation.



Table 1: Overview of planned and actual participant numbers per media partner for all three CPN pilots

	VRT		DW		DIAS	
	Objective	Reached	Objective	Reached	Objective	Reached
Pilot 1	50 end-users	56	20 friendly users	18	20 friendly users	20
Pilot 2	200 end-users	70	150 end-users	49	150 end-users	31
Pilot 3	300, open testing	695	250-300, open testing	223	250, open testing	CPN web-app: 3920 CPN mobile app: 75

The table above shows that there has been a consistent increment in the participation of end users to the pilots; this has been possible thanks to several targeted dissemination activities (including for example the organization of ad hoc presentation and demonstration events) as well as a shift in the implementation. While the consortium used the central CPN app and DW data to run a general open pilot in English for a wide audience, IVRT and DIAS directly addressed their audiences via their existing channels (or very close to that).

Even though we still missed the aimed target corridor for the DW-test group by a small bit, the efforts undertaken in comparison to the second pilot paid off and led to a higher number of testers, exceeding the overall number of testers for pilot 3 across all three media settings quite well, making the test results from pilot 3 more meaningful.

As learned in the second Pilot, users are more likely to accept and evaluate new offers, if they feel like they can trust the media behind it. This requires a known brand name and setting. VRT developed a dedicated app (exploiting CPN recommendation services) that attracted a large number of users already consuming news from their official channels (mobile app and website) while DIAS integrated them directly into some of their web-sites as will be explained later in the document. Both approaches show a large increase in users for the evaluations.

The increased maturity level of the app and recommender settings themselves also lead to higher and lasting evaluations; people are keener to take part in a pilot if an app is more stable and fully functional rather than in pre-alpha or alpha stages. Learning from this, we highly recommend the integration of personalized news services directly through existing official channels. This may seem risky because it implies a strong trust in the new technologies adopted and their impact on the publisher's user base. Fortunately, by employing CPN



modules like the “Recommender A/B testing” this risk can be highly mitigated: publishers in fact will be able to test personalization services at first on smaller groups of users and the, in case of satisfactory results (according to specific business objectives) such services can be extended to the whole user base. And the results from the Pilot 3 approach show that users value transparency and trust from a media company by giving valuable feedback and accompanying the process all the way to the end.

4.1 METHODOLOGY

In the following section, we firstly describe the overarching methodology that we applied with every media partner to collect end user feedback during the testing phase of the third CPN-prototype. Secondly, we highlight the methodological specificities for each media partner.

4.1.1 Overarching approach – user research

The third pilot phase ran from February 3rd - March 9th. In pilot 3, we had four specific prototypes, providing personalised news updates in three languages: English, Greek, and Dutch.

To put the CPN development to the test, the CPN-app was used for the open pilot group. The app contained all implemented features, as foreseen in the requirements list. To make it usable for as many people as possible, the app was based on DW’s English content offer (as an internationally used language). This allowed the whole consortium to promote the app via different channels to everyone willing to participate in the evaluation, creating a larger test group. While the content was branded as DW’s, the app itself clearly showed the CPN logo, marking it as the central open pilot application.



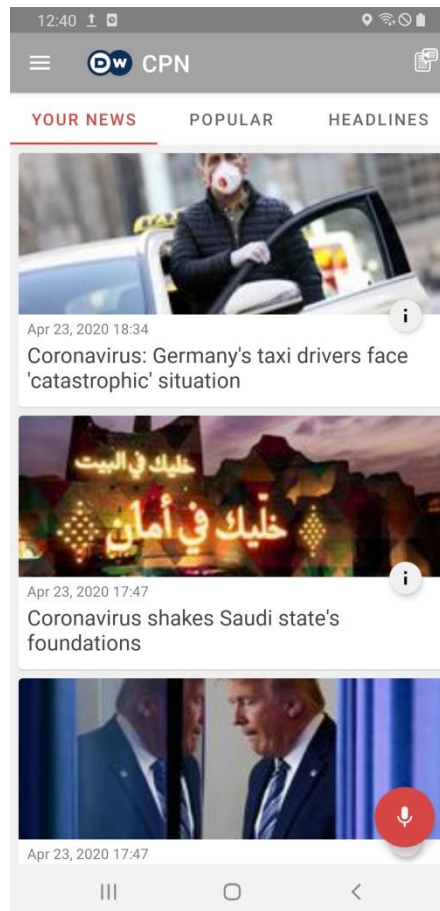


Figure 2: Screenshot CPN app - DW

Following the learnings of pilot 2 however, DIAS and VRT created additional setups for their own audiences in Greek and Dutch via their own channels. Pilot 2 had clearly shown that brand affiliation was a high success factor in reaching a larger test audience.

DIAS tested the offering of personalised content via a Greek version of the CPN app and via their own websites.

The personalization feed was implemented in two of DIAS' websites: On sigmalive.com and on city.com.cy in order to test the behaviour of the users on a real and live digital environment.





Figure 3: Screenshot of the CPN app



Figure 4: Screenshot of the implementation of personalisation on signalive.com





Figure 5: Screenshot of the implementation of personalisation on city.com.cy

VRT created an app-version similar to its main VRT NWS app and called it VRT MYNWS. The normal VRT NWS app has three streams: “hoofdpunten”, “net binnen” and “meest gelezen” (headlines, most recent and most read). In the Pilot 3 app, “meest gelezen” was replaced by “MIJN NIEUWS” (my news) and moved to the first position, in order to stimulate users to explore this stream.

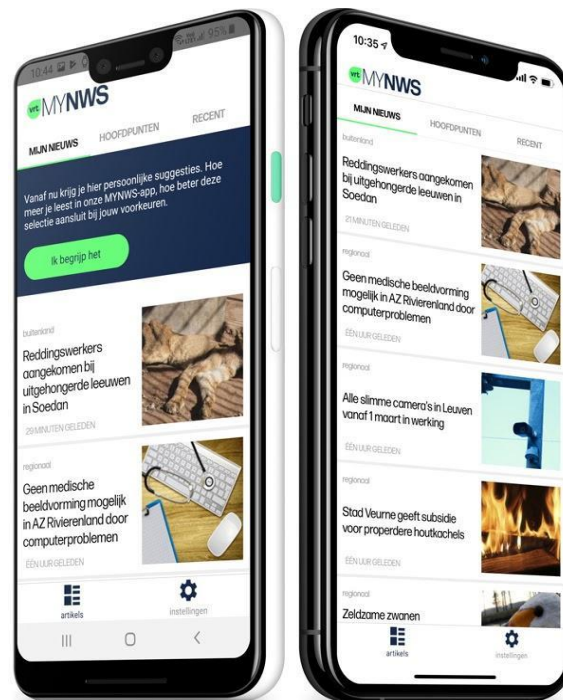


Figure 6: Screenshot of the VRT MYNWS app



The **overarching research questions** for the user research in the pilot testing phase of the third CPN-prototype for all media partners were:

1. What is the influence of personalisation on the users' feeling of being informed?
2. What is the influence of personalisation on the users' fear of missing out (FOMO)?
3. What is the influence of personalisation on the users' feeling of being isolated in a filter bubble?

Logging data on user activities was collected for each application in the form of “user events”. Actions performed by users in the apps/websites have been recorded and categorized by typology. The typologies of events recorded during pilot 3 are the following:

Table 2: Logging data

Event type	Description
Article_click	This event is fired when the user clicks on an article with the intent of reading it. These events include metadata such as a timestamp, whether or not the article was shown in the personalized feed, etc.
Reading_time	How much a user spent on the article page; this can be considered as an estimation of an “active reading time” although we are aware that there are cases in which the users have simply left the page open and they are not “actively” reading it. However this event is especially useful in the case of very short reading time as this indicates that the user clicked on an article but then promptly quit it: this is showing, for example, that the users did not appreciate the recommendation or, even, that they clicked on it by accident
Scrolling_depth	This measures how much the users actively scrolled the article until the end. This can be used to assess the degree of interest the user experienced by reading the article.
Explicit_Like/Dislike	This records the explicit binary rating given by the user to an article presented into the personalized feed.
Recommendation_list_open/close	Whether the user is accessing the personalized feed or not. Useful to assess the



	attractiveness of the personalized feed versus other feeds in the app.
App_open/close	Fired every time the user is accessing CPN app.
Social_media_connection	When the user accesses the app through social media login (Twitter and Facebook) some information about topics of interest are collected and sent to the CPN platform for user's profile enrichment.

It is worth to mention that the list of event typologies is open and can be easily extended for specific business needs. Furthermore, the actual number of events collected depends on specific front-end implementation (e.g. scroll-depth measurement on a web page or on a mobile app) and publishers can decide to implement only the collection of a subset of the described events. The minimum requirement for the CPN platform to be able to start profiling a user (and hence compute recommendations) is to implement the Article_click event.

We created an intake survey, weekly survey, final survey, and a drop-outs survey in the online survey platform Qualtrics to be able to collect quantitative feedback data from the end users who registered for the pilot testing phase of the third CPN pilot. The table below shows an overview of the set-up and distribution of the surveys per media organisation.

Table 3: Set-up and distribution of the user surveys per media organisation

Media organisation	Intake survey	Weekly survey	Final survey	Dropouts survey
VRT	X	X	X	X
DW		X	X	X
DIAS: website		X	X	
DIAS: CPN app			X	X

The pilot testing phase of the third CPN-prototype started on 3 February 2020. The users tested the app during the first week of the pilot (3-9 February 2020) but no surveys were shown. We started to distribute the first weekly survey to DW, DIAS (website), and DIAS (CPN-app) users during the second week of the pilot (10-16 February 2020). The second



weekly survey was shown during the third week of the pilot (17-23 February 2020). The third weekly survey was shown during the fourth week of the pilot (24 February - 1 March 2020). The fourth weekly survey appeared during the fifth week of the pilot (2-8 March 2020). The pilot testing phase ended on 9 March 2020. Afterwards, we distributed the final survey as well as the dropouts-survey.

The weekly surveys for VRT (three weekly surveys in total) were shown to the participants as a pop-up in the app. The final survey for VRT was sent in an email to all active users who registered to test the app. Both the weekly surveys (four weekly surveys in total) and the final survey for the DW and DIAS (CPN-app) were shown to the participants as a pop-up in the CPN app. The weekly surveys and final survey for the DIAS website respondents appeared as a pop-up on the SigmaLive website. The dropouts survey was sent via email to all users who had not opened or used the application for a duration of seven days.

The user surveys for VRT were in Dutch, the surveys for DW in English, and the surveys for DIAS (website) and DIAS (CPN-app) respondents were in Greek. The table below shows the survey items and what they intended to measure. In addition, we indicate which survey items are comparable to the user surveys that were distributed during the testing phase of the first and second CPN-prototype (pilots 1 & 2).

Table 4: User survey items and measurements

Survey item	Measure	Comparable questions pilots 1 & 2
<i>Intake survey</i> <i>*Exclusively for VRT respondents</i>		
Contact information	Name, surname, and email address	
Registration in VRT Pilot zone	<p>If you are not registered yet to the VRT Pilot zone, would you like to be a VRT test pilot?</p> <ul style="list-style-type: none"> • Yes, I want to be informed about other test flights and become a VRT test pilot • No, I only want to be kept informed about VRT MYNWS 	
Sociodemographic data	<p>Age</p> <p>Gender</p> <p>Education: What is the highest level of education that you successfully completed, either in evening school</p>	



	<p>or in daytime education? Choosing from the following options:</p> <ul style="list-style-type: none"> • primary school or no diploma • lower secondary education (general, technical, artistic or vocational) - completed the first three years • higher secondary education (general, technical, artistic or vocational) - completed the last three years • studies at college or university (candidate, bachelor (academic or professional), graduate, master, post-graduate, master after master, doctorate) 	
<i>Weekly survey</i>		
<p>Sociodemographic data</p> <p><i>*Exclusively for DW, DIAS (website), and DIAS (CPN-app) respondents</i></p>	<p>What is your gender (male, female, X)?</p> <p>Year of birth</p> <p>Education: What is the highest level of education that you successfully completed, either in evening school or in daytime education? Choosing from the following options:</p> <ul style="list-style-type: none"> • primary school or no diploma • lower secondary education (general, technical, artistic or vocational) - completed the first three years • higher secondary education (general, technical, artistic or vocational) - completed the last three years • studies at college or university (candidate, bachelor (academic or professional), graduate, master, post-graduate, master after master, doctorate) 	
<p>Subjective feeling of being informed</p>	<p>How informed did you feel after reading news in the 'my news' tab? Indicate on a scale ranging from 0 (not informed) to 10 (very informed).</p>	X
<p>Objective measure of informedness</p>	<p>Quiz with ten questions about the news from the past</p>	



*Exclusively for VRT respondents	week	
Satisfaction of the need for news	To what extent is your need for news satisfied after using the app? Indicate on a scale ranging from 0 (not at all satisfied) to 10 (highly satisfied).	X
Fear of missing out	<p>To what extent do you agree with the following statements? Indicate on a scale ranging from 1 (I highly disagree) to 5 (I highly agree):</p> <ul style="list-style-type: none"> ● I believe I would have missed something if I only read my personalized news offer in the 'my news' tab ● I experience fear of missing important news while using this app 	
Filter bubble	<p>To what extent do you agree with the following statements? Indicate on a scale ranging from 1 (I highly disagree) to 5 (I highly agree):</p> <ul style="list-style-type: none"> ● I have the impression that the articles that appear in the 'my news' tab isolate me in my own cultural or ideological bubble 	
Experience of the news offer	<p>To what extent do you agree with the following statements? Indicate on a scale ranging from 1 (I highly disagree) to 5 (I highly agree)</p> <ul style="list-style-type: none"> ● The news articles that I was offered in the 'my news' tab were very diverse ● Some articles that appeared in 'my news' have surprised me <p>Indicate how often the statements below apply to you on a scale ranging from 1 (never) to 5 (I always)</p> <ul style="list-style-type: none"> ● The articles in the 'my news' tab surprised me ● The list of articles that I received in 'my news' tab met my expectations 	X
Experience of personalisation	To what extent do you agree with the following statements? Indicate on a scale ranging from 1 (I	



	highly disagree) to 5 (I highly agree): <ul style="list-style-type: none"> I feel that the 'my news' tab contains a personalised news offer for me 	
Satisfaction with the personalised news offer	How satisfied are you with your personal list of news articles in the 'my news' tab? Scale ranging from 'extremely satisfied' to 'slight dissatisfied'.	X
News consultation via other news media	To what extent have you consulted the news via other news media (such as radio, TV, newspapers and newspaper websites / apps, other news apps, social media such as Twitter, Facebook, Instagram, etc., weekly and monthly newspapers, etc.)? Indicate on a scale ranging from 0 (very little) to 10 (very much).	X
<i>Final survey</i>		
Evaluation of the personal data receipt <i>*Exclusively for DW, DIAS (website), and DIAS (CPN-app) respondents</i>	Net Promoter Score: To what extent did you perceive the personal data receipt as a transparent approach towards data collection and processing? Open-ended question, text form: Explain your answer.	
<p>The question-type was a Net Promoter Score (NPS). This is a metric to measure user experience of and perception towards a certain business, product or service. Respondents gave a rating between 0 (not at all transparent) and 10 (very transparent) and, depending on their response, respondents fall into one of three categories to establish an NPS-score:</p> <ul style="list-style-type: none"> Promoters: score 9 or 10 and are typically loyal and enthusiastic users; Passives: score 7 or 8 and are satisfied with the service, but not happy enough to be considered promoters; Detractors: score 0 to 6 and are unhappy users who are unlikely to use the service again, and may even discourage others from using it¹. <p>The NPS-score is reported with a number between -100 to +100, a higher score is desirable. If the score is below 0, we consider this a <i>low</i> NPS-score, a score between 0 and 30 is considered a <i>medium</i> NPS-score, and a score between 30 and 100 is a <i>good</i> NPS-score².</p>		

¹ <https://www.qualtrics.com/uk/experience-management/customer/net-promoter-score/>

² <https://www.rentently.com/blog/good-net-promoter-score/>



Evaluation of the individual news streams <i>*Exclusively for VRT, DW, and DIAS (CPN-app) respondents</i>	In the CPN app you could read articles from 3 tabs: 'My News', 'Main points' and 'Recent'. How much did you like each steam? Evaluation of each news stream on a scale ranging from 0 (dislike) to 10 (like).	
Satisfaction of the need for news	To what extent is your need for news satisfied after using the app? Indicate on a scale ranging from 0 (not at all satisfied) to 10 (highly satisfied).	X
Satisfaction with the relevance of the individual news streams <i>*Exclusively for DW, DIAS (website), and DIAS (CPN-app) respondents</i>	How satisfied were you with the relevance of the articles that appeared in each tab? Evaluation of each news stream on a scale ranging from 1 (extremely satisfied) to 5 (extremely dissatisfied).	X
Subjective feeling of being informed	How informed did you feel after reading news in the 'my news' tab? Indicate on a scale ranging from 0 (not informed) to 10 (very informed).	X
Fear of missing out	To what extent do you agree with the following statements? Indicate on a scale ranging from 1 (I highly disagree) to 5 (I highly agree): <ul style="list-style-type: none"> • I believe I would have missed something if I only read my personalized news offer in the 'my news' tab • I experience fear of missing important news while using this app 	
Filter bubble	To what extent do you agree with the following statements? Indicate on a scale ranging from 1 (I highly disagree) to 5 (I highly agree): <ul style="list-style-type: none"> • I have the impression that the articles that appear in the 'my news' tab isolate me in my own cultural or ideological bubble 	
Experience of the news offer	To what extent do you agree with the following statements? Indicate on a scale ranging from 1 (I highly disagree) to 5 (I highly agree) <ul style="list-style-type: none"> • The news articles that I was offered in the 	X



	<p>'my news' tab were very diverse</p> <ul style="list-style-type: none"> Some articles that appeared in 'my news' have surprised me <p>Indicate how often the statements below apply to you on a scale ranging from 1 (never) to 5 (I always)</p> <ul style="list-style-type: none"> The articles in the 'my news' tab surprised me The list of articles that I received in 'my news' tab met my expectations 	
Experience of personalisation	<p>To what extent do you agree with the following statements? Indicate on a scale ranging from 1 (I highly disagree) to 5 (I highly agree):</p> <ul style="list-style-type: none"> I feel that the 'my news' tab contains a personalised news offer for me 	
News consultation via other news media	<p>To what extent have you consulted the news via other news media (such as radio, TV, newspapers and newspaper websites / apps, other news apps, social media such as Twitter, Facebook, Instagram, etc., weekly and monthly newspapers, etc.)? Indicate on a scale ranging from 0 (very little) to 10 (very much).</p>	X
<p>Location of app usage</p> <p><i>*For DIAS (website) respondents the word 'app' was replaced with 'my news' service</i></p>	<p>Where did you usually consult the CPN app? Choosing from the following options:</p> <ul style="list-style-type: none"> Home Work The place varies depending on when I had time Other: (text box) 	X
<p>Satisfaction with the app</p> <p><i>*For DIAS (website) respondents the word 'app' was replaced with 'my news' service</i></p>	<p>How satisfied are you with the app in general? Indicate on a scale ranging from 'extremely satisfied' to 'extremely dissatisfied'.</p>	X
Satisfaction with personalised	<p>How satisfied are you with your personal list of news articles in the 'my news' tab? Scale ranging from</p>	X



news offer	‘extremely satisfied’ to ‘slight dissatisfied’.	
Evaluation of user-friendliness, ease of use, arrangement and visual attractiveness <i>*For DIAS (website) respondents the word ‘app’ was replaced with ‘my news’ service</i>	To what extent do you agree with the following statements? Indicate on a scale ranging from 1 (I highly disagree) to 5 (I highly agree). <ul style="list-style-type: none"> • This app is user friendly • I find everything I am looking for easily in this app • This app is well-arranged • This app is visually attractive 	
Technical functioning <i>*For DIAS (website) respondents the word ‘app’ was replaced with ‘my news’ service</i>	Did the CPN app work properly during the test (yes/no-question)? <ul style="list-style-type: none"> • Follow-up question if no (text form): You said that not everything works well. Can you briefly indicate below what went wrong? 	X
Future use of the app <i>*For DIAS (website) respondents the word ‘app’ was replaced with ‘my news’ service</i>	Would you like to use the CPN app even further in the future? Indicate on a scale ranging from 1 (certainly not) to 5 (certainly).	X
Recommending the app to others <i>*For DIAS (website) respondents the word ‘app’ was replaced with ‘my news’ service</i>	Net promoter score: How likely are you to recommend this app to a friend or colleague?	X
Attitude towards news personalisation	Net promoter score: “Indicate to what extent news personalization is ...”, on a scale ranging from 0 (unnecessary) to 10 (very useful)	X
Dropouts survey <i>*Exclusively for VRT, DW, and DIAS (CPN-app) respondents</i>		
Main reasons for not continuing to test the app	What is (are) the main reason (s) why you did not continue testing this app? Indicating multiple answers	



	<p>is possible. Choosing from the following options:</p> <ul style="list-style-type: none"> ● I was curious to see the app, but I wasn't going to use it often ● After registering, I had forgotten that I had downloaded this app ● I realized that I don't want personalized news ● I thought the app wasn't working well enough ● I found the news offer not (sufficiently) personalized ● I didn't want to spend time on it ● I only use a few apps and this app is not in my habit of daily use ● I already use other news sites or apps and found this app no added value ● Other: (text box) 	
--	--	--

We provide an overview of the participation numbers in the surveys per media organisation in the table below.

Table 5: Participation numbers of the user surveys per media organisation

Media organisation	Weekly surv. 1	Weekly surv. 2	Weekly surv. 3	Weekly surv. 4	Final survey	Dropouts survey
VRT	280	272	248	n.a.	303	190
DW	21	3	4	1	6	27
DIAS: website	334	275	228	199	227	n.a.
DIAS: CPN app	0	5	1	0	8	12



4.1.2 Specific research questions & approaches per media organisation

4.1.2.1 Central Open Pilot / DW

As mentioned in the description of the setup, the DW content was used for the English open pilot with CPN's own personalisation app. Since this setup was designed as the main evaluation for pilot 3, there were no specific research questions outside the standard evaluation survey used for all three pilot setups.

4.1.2.2 VRT

VRT divided the test users into three groups. The A-group was given a content based recommender algorithm. The B-group was given random articles as a control group. The C-group. The first two users who registered in the MY NWS app were put in group A, which was served articles by the content-based recommender while the third registered user was put in group B, the control group. The fourth and fifth registered users were put in group C, receiving the CPN recommendations. The next two went again to group A, and so on. This made it possible to continuously add test users, while keeping the groups A and C similar in size, and about double the size of group B. It also increased the chances that the groups are composed of equal mixtures of sociodemographic features. The table below shows the number of testers in each group, per recommender type.

Table 6: User groups VRT pilot (active users only)

Group	Recommender type	Number of testers
A	simple content-based	288
B	random	136
C	CPN hybrid	271

The table below provides an overview of the sociodemographic data of the registered users for the VRT pilot.

Table 7: Sociodemographic overview of the registered user for the VRT pilot

Total registered count	Gender	Age	Education
1472	Male: 1163 Female: 303	Mean age: 46 Minimum: 14	Higher education: 1044 High school degree: 340



	X: 5	Maximum: 93	Middle school degree: 71 No diploma: 13
--	------	-------------	--

Furthermore, VRT logged the user behaviour for four weeks (February 15 to March 17, 2020).

Research questions pilot 3 VRT MYNWS app

For VRT we had these additional research questions:

User behaviour

What is the influence of the personalisation algorithm on the amount of clicks, reads, reading times, scroll depth, and diversity of the articles that were recommended?

Hypotheses: The personalisation algorithms will lead to better informed citizens. We use clicks, reading times, scroll depth and diversity as proxies for informedness.

User experience

1. What is the influence of personalisation on the users' feeling of being informed?
 - a. What is the influence of personalisation on a subjective metric of informedness?
 - b. What is the influence of personalisation on an objective metric of informedness?
2. What is the influence of personalisation on the users' fear of missing out (FOMO)?
3. What is the influence of personalisation on the users' feeling of going into a filter bubble?

Hypotheses:

1. User experience
 - a. Participants in A (content-based algorithm) and C (hybrid CPN recommender algorithm) group (personalised groups) will have a higher mean score on the subjective and objective (Quiz) metric of informedness than the B group (control group).
 - b. In group A and C we expect a positive relation between the fraction of clicks in the MYNWS tab and the subjective and objective metric of informedness.
2. Fear of missing out



- a. Participants in A (content-based algorithm) and C (hybrid CPN recommender algorithm) group (personalised groups) will have an equal mean score on the FOMO measures as the B group (control group).
 - b. There will be a non-existent relation of FOMO with a fraction of use of my news tab.
3. Filter bubble: Participants in A (content-based algorithm) and C (hybrid CPN recommender algorithm) group (personalised groups) will have an equal mean score on filter bubble measures as the B group (control group).

Remark:

In an attempt to measure informedness of the users objectively, VRT added 10 multiple-choice questions on news topics to the weekly and final surveys. The questions were based on important articles published during the week before the survey was sent out. We tried to cover a broad range of topics: no two questions in one week were about the same news event. The scores on these quizzes are considered a proxy for informedness. The weekly quizzes can be found in the appendix (in Dutch).

4.1.2.3 DIAS

Research questions DIAS Web app

For DIAS the main research questions were:

User experience

When a personalization option is available in a website, how many users will try the service, and how many will follow the regular navigation through the website?

Hypotheses:

The personalization algorithm will increase the consumption of articles as the user is exposed to more relevant content based on their interests.

Participants are divided in two groups with two subgroups each

1. Users that logged in and had just one session during the pilot (All users)
 - a. Users followed regular navigation and not used the personalization page
 - b. Users that used the personalization page
2. Users that logged in and had 2 or more sessions during the pilot (Returning users)
 - a. Users followed regular navigation and not used the personalization page
 - b. Users that used the personalization page



Users that used the personalization page are expected to record higher on average consumption of articles than users that did not use the personalization page. We use “page views” to count consumption of articles.

User behaviour

Is an email registration process an obstacle for users to experience a personalization service? Do they prefer a one click login functionality instead?

Hypotheses: An implementation of one click login should record more participants than the registration process.

4.2 PARTICIPANTS RECRUITMENT REPORT

For pilot 3, we intensified our recruitment effort, to ensure we could reach sufficient testers. Each media partner focused on their own recruitment via their different media channels as described below.

Furthermore, we created a Facebook and Instagram page for the project, in order to buy social media advertisements to reach potential testers. These campaigns were successful, the specific social media activities and campaigns are discussed and described in D5.4., Final report on dissemination.

4.2.1 Open Pilot / DW

Similar to the previous pilot, DW has utilized its customer service database to recruit users for the third pilot. An open invitation was sent to a selected number of the international DW audience (English speaking audience members), including the group that had already participated in the previous rounds. In total about 6.000 audience members were contacted this way. Furthermore, DW promoted the pilot via its Innovation social media channels. Several tweets with info and links to the CPN website were sent out to the more than 5.000 Twitter followers as well as to the more than 700 LinkedIn Followers. The DW Innovation team also promoted the pilot in house among the DW staff.

In addition, DW directly recruited users for the third iteration of the app testing among journalism students from five universities and their learning facilities in Bangladesh as part of its educational corporation with DW Academy and CPN dissemination activities. Five workshops on news personalisation and digital transformation of the newsrooms towards customer personalisation of content were conducted in the capital Dhaka as well as University towns Rajshahi and Comilla. Altogether about 200 students and 10 faculty personnel attended the workshops which were divided into two parts. The first part was a lecture on the social, technical and ethical aspects of news personalisation. The second part was an introduction to and the testing of the CPN app. The students were given a live presentation of the app and asked to download it themselves. Afterwards the students continued to use the app for up to 4 weeks after the workshop, following the pilot 3 setup.

All general promotion of the CPN pilot done by the consortium was also added to the open pilot setup using the CPN app with DW content.

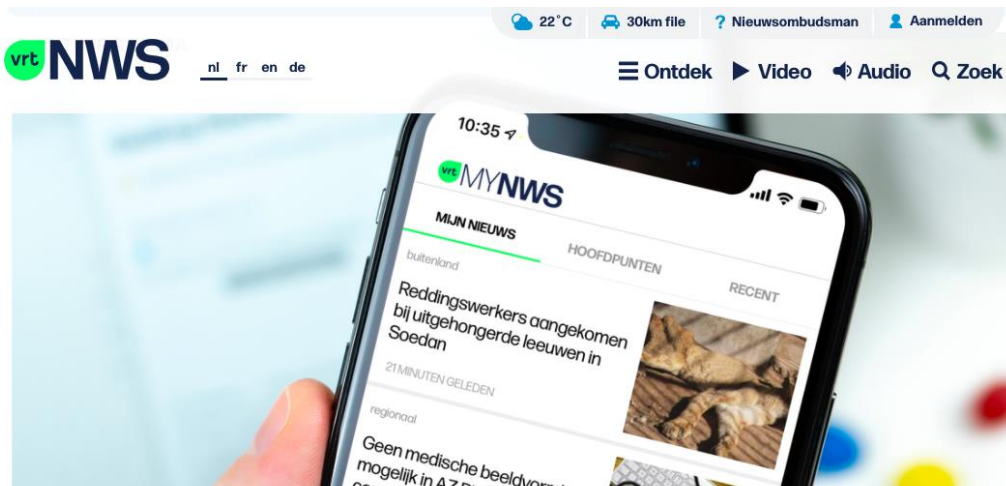


In total 213 users actively participated in the open Pilot, using the CPN app with DW content.

4.2.2 VRT

VRT combined multiple channels to advertise the pilot as widely as possible:

- The pilot was mentioned on the Pilotzone webpage and a dedicated mailing was sent out to Pilotzone testers.
- Furthermore, a message was posted on the VRT Innovation Facebook page and VRT Innovation website,
- A message also appeared on internal screens to inform/attract VRT employees and
- An article was published on the VRT NWS website, the pilot was mentioned on the VRT website and in several internal & external newsletters.



VRT NWS zoekt testers voor gepersonaliseerd nieuwsaanbod

ma 10 feb 12:00



Vind je dat er een overaanbod aan nieuws is en dat het soms moeilijk is om keuzes te maken? Met de VRT MYNWS-app, de naam verklapt het al, bieden we VRT NWS-lezers in een proeftraject nieuws op maat aan. Binnen dit project testen we software die analyseert wat



Figure 7: Screenshot VRT NWS article



Figure 8: Screenshot VRT Pilootzone

This approach was successful, as **695 testers** participated actively in the VRT pilot.

All interested participants were directed to this registration page on VRT Pilootzone³. The VRT MYNWS app was available to the participants as an Android or iOS app that could be freely downloaded in the respective Play and Apple store.

4.2.3 DIAS

4.2.3.1 Web app: installation of CPN personalisation on sigmalive.com & city.com.cy via ID Ward plugin provided by Yoop

As a recruitment measure, DIAS published an article on SigmaLive, titled “Our new technology exclusively for you! Read and win!”⁴ on 22/1/2020. In order to engage users to the pilot and recruit them for long term testing, DIAS used a significant incentive which was one trip for two to Athens. The article was also referring to the incentive for the participants. A link to the terms and conditions⁵ for the competition was also included in the article. However, due to coronavirus the winner and the runners-up that came up from the draw did not accept the incentive.

³ <https://www.pilootzone.be/prototype/mijn-nieuws-met-vrt-mynws>

⁴ <https://www.sigmalive.com/news/local/607900/i-nea-apokleistiki-texnologia-tou-sigmalive>

⁵ <https://www.sigmalive.com/oroi-xrisis-diagnwismou>



The article, during its lifetime had 8,540 unique page views and a total of 9,615 views.

Afterwards, the article was posted on Facebook⁶ on 5/2/2020. Facebook remarketing activities and promotion of main article on lookalike audience during 6/2/2020 - 20/2/2020. The post reached 58,127 users in total and had 5,956 clicks.

The article was also promoted via SigmaLive's Instagram account via story with a swipe up feature on 5/2/2020. The story reached 1,125 accounts, had 1,377 impressions and 83 link clicks.

The article was sent via SigmaLive Newsletter on 6/2/2020. The newsletter was opened by 1038 recipients out of 3780 subscribers and 77 of them clicked on the article.

A second article titled "Everything you need to know on how to use our new technology"⁷ explaining to the user the process of the service My News was published on 14/2/2020.

The article, during its lifetime had 265 unique page views and a total of 283 views. The article was also posted on Facebook⁸ on 18/2/2020. The post reached 1,796 people and had 17 clicks.

On top of that, Dias also presented the new technology at Sigma tv's morning news broadcast "Protoselido"⁹ on 25/2/2020. The General Manager of SigmaLive Network, Christos Danezis, informed the audience regarding personalisation and pilot 3. The viewing during 9:15 – 9:30 was 16,2% according to Nielsen. During that day, a related article¹⁰ to the video of the interview was published on SigmaLive. The article had 90 unique page views and 98 views in total.

In addition, web banners promoting Pilot 3 and personalization were implemented on SigmaLive with the number of 1,729,281 impressions and 1856 clicks in total with an average CTR 0.11%.

At the end of the recruitment process, DIAS managed to have an aggregated number of 3920 users.

4.2.3.2 CPN app

First, there was a telephone contact with users of Pilot 2 who participated in the interviews, informing them about the launch of Pilot 3, asking them if they want to participate. Secondly, an email via Mailchimp¹¹ was sent to all the subscribers of CPN (from pilot 2) in order to

⁶ https://www.facebook.com/sigmalivecy/posts/10157635899058580?__tn__=-R

⁷ <https://www.sigmalive.com/news/local/611378/ola-osa-xreiazetai-na-gnorizete-gia-tin-xrisi-tis-neas-mas-texnologias>

⁸ https://www.facebook.com/sigmalivecy/posts/10157675888273580?__tn__=-R

⁹ <https://www.youtube.com/watch?v=Z9bCaut2yJo>

¹⁰ <https://www.sigmalive.com/news/local/613222/to-sigmalive-kainotomei-me-ti-dokimastiki-ekdosi-tis-neas-tou-texnologias>

¹¹ <https://mailchimp.com/>



inform them about the start of Pilot 3 and the incentive for those who will fully participate in the Pilot. The email was opened by 73 subscribers out of 134 recipients. The CPN app and its operation was also mentioned in the main article published on SigmaLive on 22/1/2020, with the link leading to the Play Store for downloading the app in Android devices.

At the end of the recruitment process, DIAS managed to have 75 users on the CPN app.

4.3 EVALUATION RESULTS

4.3.1 VRT

4.3.1.1 VRT MYNWS user behaviour analysis

To get a general idea of the user engagement, the figure below shows the daily number of read events for each group. Notice that in the beginning of the test period, group B has great engagement, especially when we take into account that the group is only half the size of the other groups. However, later on, the usage drops to almost nothing, as if users were fed up with receiving random articles. The usage of group C drops away from group A towards the end of the test period.

A week trend is well observable for groups A and B. This can also be seen on VRTNWS.

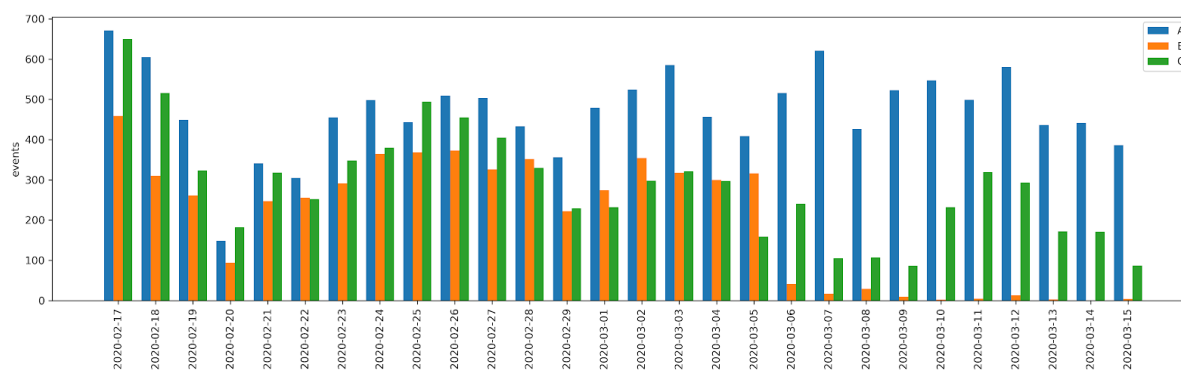


Figure 9: Daily events per group (VRT)

The **number of clicks** per user can be seen in the table below, averaged over the groups. In order to find out if there is one group that is statistically different from the other, we perform the Kruskal-Wallis¹² H-test. The p-value for this test is 0.61, indicating no significant difference, hence further analysis is not necessary.

Wilcoxon ranksums:

mean(A) = 38

mean(B) = 35

mean(C) = 28

The **fraction of clicks in the personalized stream** (“MIJN NIEUWS”) is shown in the table below. The Kruskal-Wallis H-test p-value is 0.0089, indicating that at least one group is

¹² <https://docs.scipy.org/doc/scipy/reference/generated/scipy.stats.kruskal.html>



significantly different from the other ones. We further compare the groups pairwise with the Wilcoxon rank sum¹³ test. Group C has a significantly higher fraction than the other groups.

Wilcoxon ranksums:

mean(A) = 0.74, mean(B) = 0.7, p-value = 0.2324

mean(A) = 0.74, mean(C) = 0.78, p-value = 0.0317

mean(B) = 0.7, mean(C) = 0.78, p-value = 0.0053

The **read times per event** are shown in the table below. The Kruskal-Wallis H-test p-value is $O(10^{-19})$. Group A outperforms the other groups, and group B outperforms group C.

Wilcoxon ranksums:

mean(A) = 92 s, mean(B) = 86 s, p-value = $O(10^{-7})$

mean(A) = 92 s, mean(C) = 83 s, p-value = $O(10^{-18})$

mean(B) = 86 s, mean(C) = 83 s, p-value = 0.0061

The **scroll depth per event**, i.e. the fraction of the article that has been shown on the user's screen, is shown in the table below. The Kruskal-Wallis H-test p-value is $O(10^{-22})$. The differences are small, but statistically significant. Group A is slightly better than the other groups.

Wilcoxon ranksums:

mean(A) = 67 %, mean(B) = 64 % s, p-value = $O(10^{-23})$

mean(A) = 67 %, mean(C) = 66 % s, p-value = $O(10^{-5})$

mean(B) = 64 %, mean(C) = 66 % s, p-value = $O(10^{-8})$

In order to cope with the filter bubble, we also monitored the diversity of the recommendation lists and of the articles selected by the users. We started by defining the distance between two articles. For that, we vectorised the article texts by 1-gram bag-of-words with a tf-idf weighting¹⁴, and then calculated the cosine distances between all article pairs¹⁵. The diversity of a list of articles (be it a recommendation list or the list of articles opened by a user) is the average of the distances between all item pairs in the list, similar to the diversity metric of Ziegler et al¹⁶. Since cosine distances between vectors composed of positive numbers range 0 to 1, the diversity is also within this range.

The table below shows the **diversities of the recommendation lists**. The Kruskal-Wallis H-test p-value is 0. Obviously, the random recommender of group B offers the most diverse lists, and the simple content-based recommender of group A is the least diversified.

Wilcoxon ranksums:

mean(A) = 0.81, mean(B) = 0.86, p-value = 0.0

¹³ <https://docs.scipy.org/doc/scipy/reference/generated/scipy.stats.ranksums.html>

¹⁴ https://scikit-learn.org/stable/modules/feature_extraction.html

¹⁵ https://scikit-learn.org/stable/modules/generated/sklearn.metrics.pairwise.cosine_distances.html

¹⁶ Ziegler, C.-N., et al., Improving Recommendation Lists Through Topic Diversification, WWW 2005, May 10-14, Chiba, Japan



mean(A) = 0.81, mean(C) = 0.85, p-value = 0.0
 mean(B) = 0.86, mean(C) = 0.85, p-value = 0.0

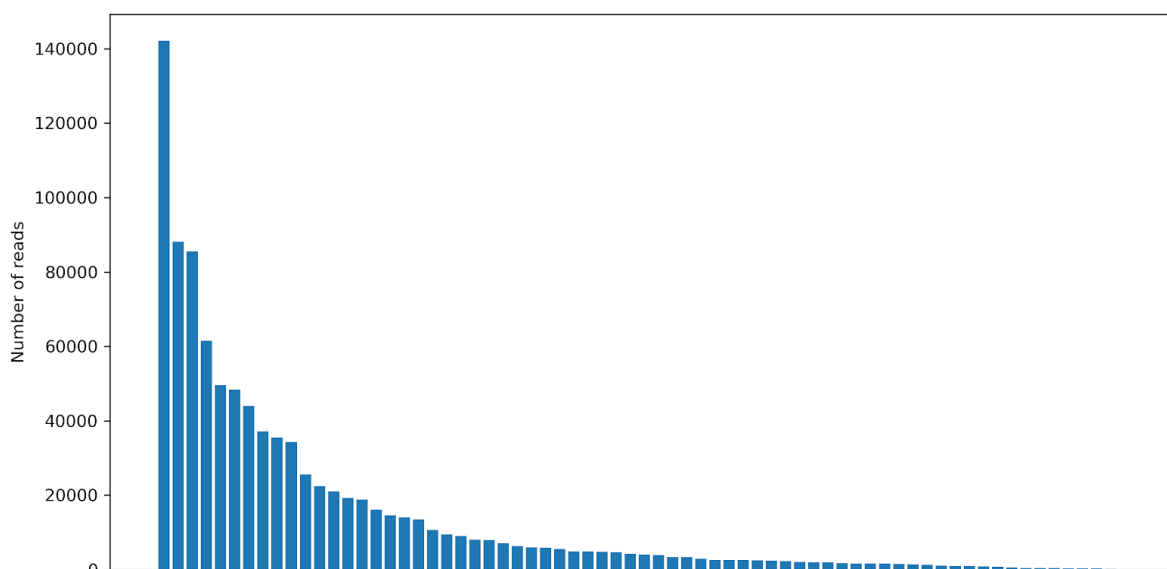
This is reflected in the **diversity of the selection of the users**: group B has the highest degree of diversity, followed by group C, and finally group A. Interestingly, the diversities of user selections are lower than those of the recommendation lists. This could be due to the fact that a user still selects from a small subset, even if a diverse list is presented, but it is also because the recommendation lists always contained 30 items, whereas the user selection lists are often much shorter.

The Kruskal-Wallis H-test p-value is $O(10^{-6})$.

Wilcoxon ranksums:

mean(A) = 0.66 s, mean(B) = 0.71 s, p-value = 0.0
 mean(A) = 0.66 s, mean(C) = 0.7 s, p-value = 0.0003
 mean(B) = 0.71 s, mean(C) = 0.7 s, p-value = 0.0946

An often-mentioned risk with recommender systems, is the decreasing consumption of items in the long tail. In other words, many recommender systems have a tendency to promote popular items and neglect rarely consumed ones. Especially these hidden items could be very interesting to recommend to a user¹⁷. Already on VRTNWS, without a recommender, there are a few articles that are read by many users, and there are many articles that are selected by only a small fraction of the users. It is the wish of many newsrooms to promote items in the long tail. The figure below shows the number of reads of the articles on VRTNWS, that were published and read on February 17, 2020. We see a handful of very popular items, and then a quick fall-back to very low consumption in the long tail. Even the second most popular article receives around 40% less attention than the most popular one.



¹⁷ Abdollahpouri, H. et al., Controlling Popularity Bias in Learning-to-Rank Recommendation, RecSys'17, August 27–31, 2017, Como, Italy



Figure 10: Number of reads of the articles on VRTNWS, that were published & read February 17, 2020

How big this problem is, is mainly up to the editors and to the staff. However, we feel that a recommender system that strongly lowers the consumption of items in the long tail, and pushes the most popular items, will not be accepted by most publishers. Therefore, it is important to see what happens when our different recommender systems are deployed.

We use the **entropy** to monitor the usage of items in the long tail. Take the list of all items ever presented in all recommendations lists of one of the test groups. Count the occurrences of each item and divide the counts by the length of the list of all items. This results in a list of probabilities p_i for each item. The entropy of this list is then¹⁸

$$H(X) = -\sum (p_i * \log p_i)$$

If the list is composed of equal numbers of all items, the entropy is maximal. On the other hand, if the list is composed of just one item, the entropy is zero¹⁹.

The table and the figure below compare the entropies of the recommendation lists and of the selected items within a group. Although group C has the highest entropy in the recommendations, it has the lowest entropy in the consumption. Group A has moderate entropy in the recommendations, and the highest entropy in the consumption.

Table 8: Entropy of recommendation lists and user selections, VRT MYNWS

group	entropy_rec	entropy_sel
A	10.37	10.16
B	10.33	9.95
C	10.55	9.77

¹⁸ [https://en.wikipedia.org/wiki/Entropy_\(information_theory\)](https://en.wikipedia.org/wiki/Entropy_(information_theory))

¹⁹ Entropy was used by Tian and Ekstrand to check the bias of recommenders, i.e. the preference for certain categories of items. Our analysis is similar, if we consider each item to be its own category. (Tian, M. and Ekstrand, M., Estimating Error and Bias in Offline Evaluation Results, CHIIR '20, March 14–18, 2020, Vancouver, BC, Canada).



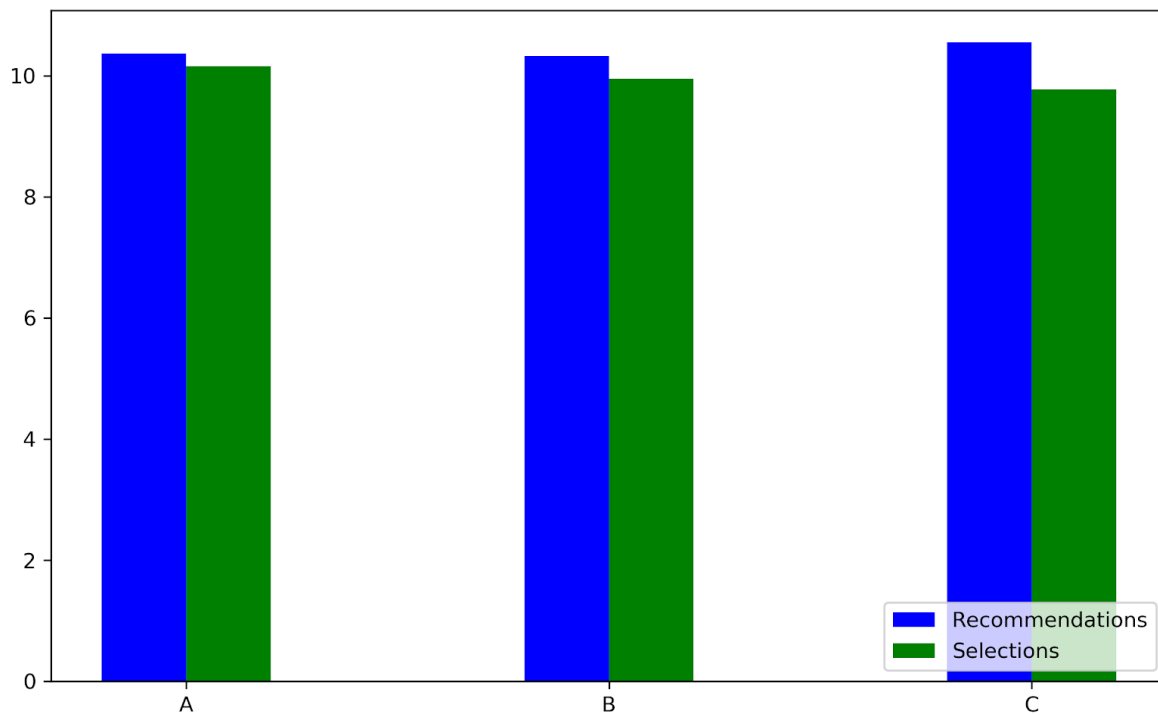


Figure 11: Entropy of recommendation lists and user selections, VRT MYNWS

In summary:

- There is no significant difference in the number of clicks
- Users in group C read more from the personalized stream
- User from group A have read longer and the scrolled deeper
- Group B has the highest diversity in the recommendation lists, and consequently in the user selections.
- Group C recommends the most long-tail articles, but group A consumes these items more.

The table below summarizes our findings.

Table 9: Results of user behaviour analysis, VRT MYNWS

Metric	Group A	Group B	Group C
	Content-based	Random	Advanced



Clicks	38	35	28
Click fraction in personalized stream	0.74	0.7	□0.78
Read time	□92 s	86 s	83 s
Scroll depth	□67 %	64 %	66 %
Diversity of recommendations	0.81	□0.86	0.85
Diversity of selections	0.66	□0.71	0.7
Entropy of recommendations	10.37	10.33	□10.55
Entropy of selections	□10.16	9.95	9.77

4.3.1.2 VRT user survey results

Number of participants:

Week 1 N= 280

Week 2 N= 272

Week 3 N= 248

Week 4 N= +-200

Informedness (subjective and objective measures)

Hypothesis: Participants in A (content-based algorithm) and C (hybrid CPN recommender algorithm) group (personalised groups) will have a higher mean score on the subjective and objective measure of informedness than the B group (control group).

Week 1 (N= 280)

Subjective feeling of informedness

There is no statistically significant relationship between test Group and the feeling of informedness. Hence, in week 1 the above hypothesis cannot be confirmed.



ANOVA

P-Value 0,447

Effect Size (Cohen's f) 0,077

	Group Average	Median	Sample Size	Confidence Interval of Average	Standard Deviation
A	6,73	7,0	96	6,41 to 7,05	1,56
B	6,83	7,0	59	6,38 to 7,28	1,71
C	7,02	7,0	115	6,69 to 7,34	1,75

Objective measure of informedness, quiz

There is no statistically significant relationship between Test Group and Score on the knowledge quiz.

ANOVA

P-Value 0,353

Effect Size (Cohen's f) 0,09

	Group Average	Median	Sample Size	Confidence Interval of Average	Standard Deviation
A	6,60	8,0	101	5,98 to 7,23	3,18
B	5,92	7,0	61	5,07 to 6,76	3,30
C	6,60	8,0	118	6,05 to 7,16	3,04

*Week 2*Subjective feeling of informedness

There is no statistically significant relationship between test Group and the feeling of informedness. Hence, in week 2 the above hypothesis cannot be confirmed.

ANOVA

P-Value 0,912



Effect Size (Cohen's f) 0,028

Group	Average	Median	Sample Size	Confidence Interval of Average	Standard Deviation
A	7,03	7,0	96	6,70 to 7,36	1,63
B	7,09	7,0	46	6,62 to 7,56	1,59
C	7,13	7,0	91	6,81 to 7,46	1,56

Objective measure of informedness, quiz

There is no statistically significant relationship between Test Group and Score on the knowledge quiz.

ANOVA

P-Value 0,623

Effect Size (Cohen's f) 0,063

Group	Average	Median	Sample Size	Confidence Interval of Average	Standard Deviation
A	6,89	7,0	102	6,47 to 7,31	2,13
B	6,65	7,0	46	5,96 to 7,34	2,33
C	6,59	7,0	93	6,11 to 7,07	2,35

Week 3

Subjective feeling of informedness

There is no statistically significant relationship between test Group and the feeling of informedness. Hence, in week 3 the above hypothesis cannot be confirmed.

ANOVA

P-Value 0,777

Effect Size (Cohen's f) 0,056



Group	Average	Median	Sample Size	Confidence Interval of Average	Standard Deviation
A	6,65	7,0	72	6,23 to 7,07	1,79
B	6,90	7,0	30	6,27 to 7,53	1,69
C	6,81	7,0	58	6,33 to 7,29	1,84

Objective measure of informedness, quiz

There is no statistically significant relationship between Test Group and Score on the knowledge quiz.

ANOVA

P-Value 0,64

Effect Size (Cohen's f) 0,07

Group	Average	Median	Sample Size	Confidence Interval of Average	Standard Deviation
A	6,50	6,5	72	6,19 to 6,81	1,32
B	6,74	7,0	31	6,32 to 7,17	1,15
C	6,63	7,0	59	6,26 to 7,00	1,43

Week 4

Subjective feeling of informedness

There is no statistically significant relationship between test Group and the feeling of informedness. Hence, in week 4 the above hypothesis cannot be confirmed.

Objective measure of informedness, quiz

There is no statistically significant relationship between Test Group and Score on the knowledge quiz.



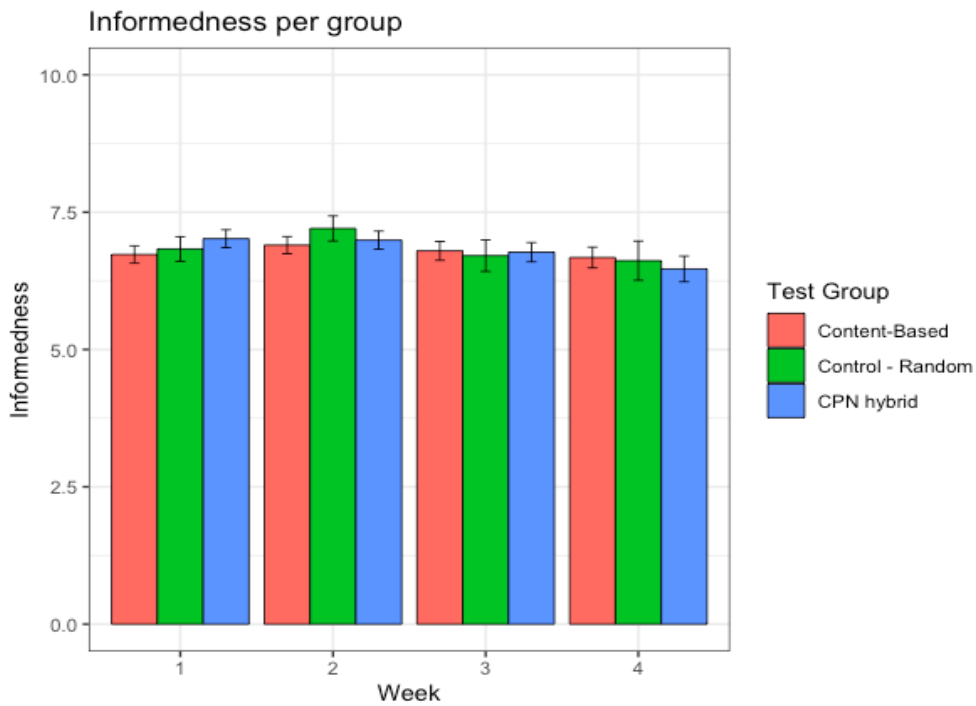


Figure 12: Mean subjective feeling of informedness over the 4 weeks with SE as error bars.

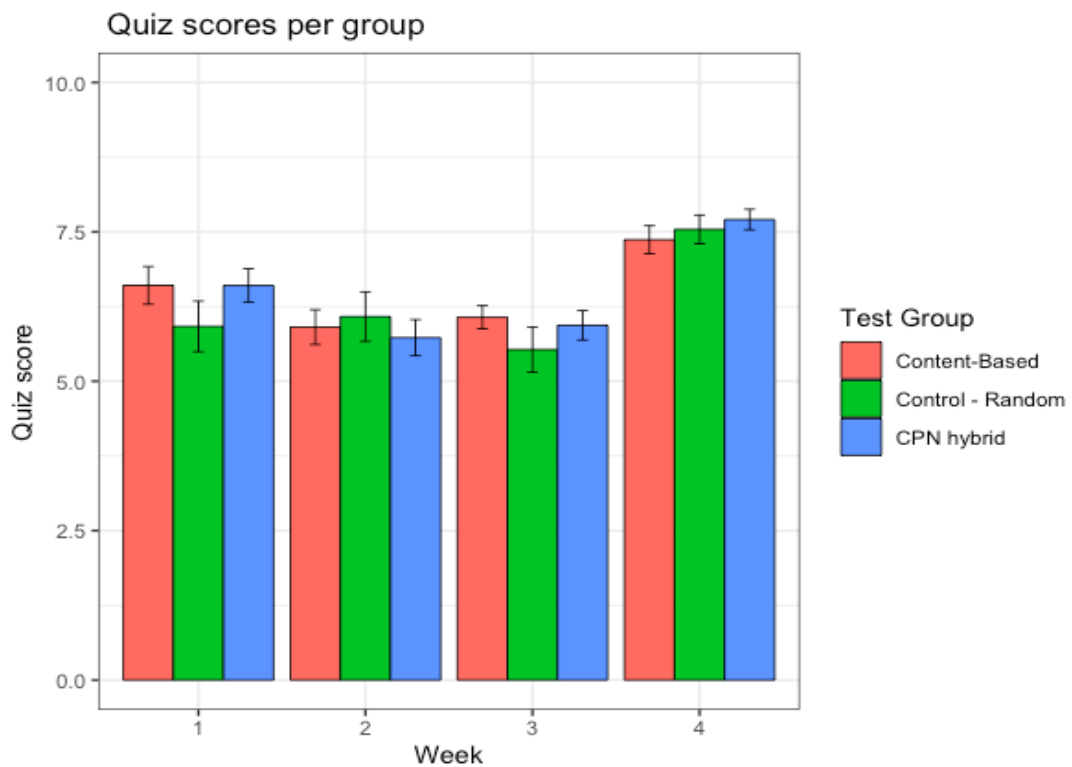


Figure 13: Mean objective measure of informedness over the 4 weeks

In groups A and C we expect a positive relation between the number of read time; clicks and scroll depth in the MYNWS tab and the subjective and objective measure of feeling of informedness.

There is no interaction between the test group and clicks, read time or scroll depth. Hence the above hypothesis cannot be confirmed.

Conclusion Informedness

In general, the people in the respective group do not differ on how well they feel informed.

Fear of Missing out (FOMO)

What is the influence of personalisation on the users' fear of missing out (FOMO)?

Hypotheses:

- a. Participants in A (content-based algorithm) and C (hybrid CPN recommender algorithm) group (personalised groups) will have an equal mean score on the FOMO measures as the B group (control group).
- b. There will be a non-existent relation of FOMO and fraction of use of my news tab.

Week 1

Believe of missing out:

There is no statistically significant relationship between the test group and the belief they missed out (ANOVA, $p = .39$). Hence, in week 1 the above hypothesis can be confirmed.

Actual fear of missing out:

There is no statistically significant relationship between the test group and the fear they missed out (ANOVA, $p = .62$). Hence, in week 1 the above hypothesis can be confirmed.

Week 2

Believe of missing out:

There is no statistically significant relationship between the test group and the belief they missed out (ANOVA, $p = .45$). Hence, in week 2 the above hypothesis can be confirmed.

Actual fear of missing out:

There is no statistically significant relationship between the test group and the fear they missed out (ANOVA, $p = .67$). Hence, in week 2 the above hypothesis can be confirmed.



Week 3

Believe of missing out:

There is no statistically significant relationship between the test group and the belief they missed out (ANOVA, $p = .31$) . Hence, in week 3 the above hypothesis can be confirmed.

Actual fear of missing out:

There is no statistically significant relationship between the test group and the fear they missed out (ANOVA, $p = .73$) . Hence, in week 3 the above hypothesis can be confirmed.

Week 4

Believe of missing out:

There is no statistically significant relationship between the test group and the belief they missed out (ANOVA, $p = .12$) . Hence, in week 3 the above hypothesis can be confirmed.

Actual fear of missing out:

There is no statistically significant relationship between the test group and the fear they missed out (ANOVA, $p = .70$) . Hence, in week 3 the above hypothesis can be confirmed.



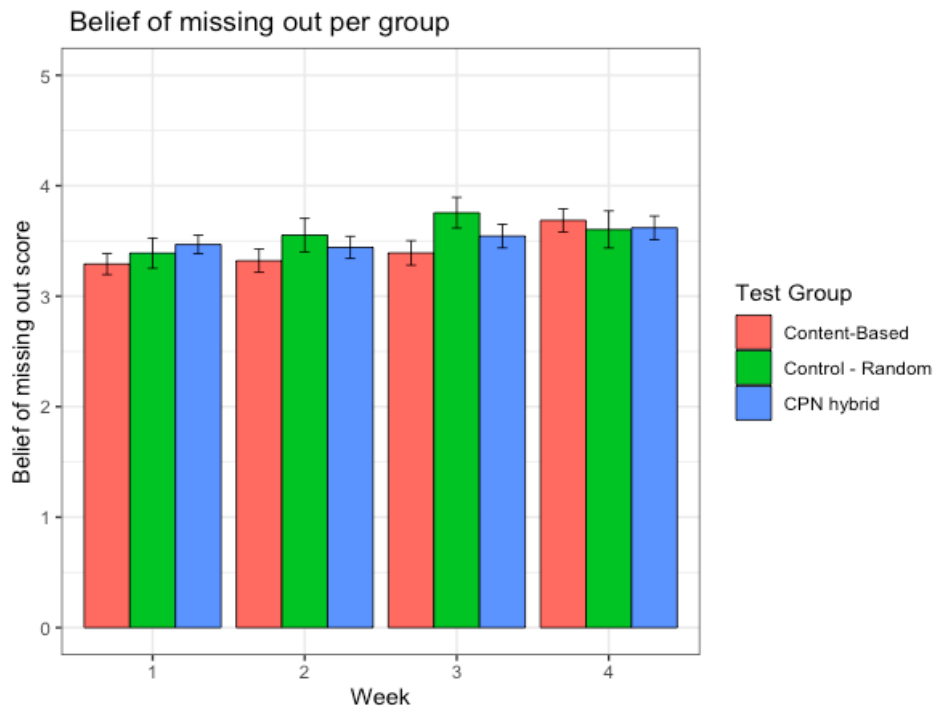


Figure 14: Belief of missing out per week and per group



Figure 15: Fear of missing out per week and per group

Conclusion FOMO

There are no differences between the groups with regard to FOMO. So the hypothesis that people might experience more fear of missing out when reading personalised news can be dismissed in this pilot.

Filter bubble

What is the influence of personalisation on the users' feeling of going into a filter bubble? It is often said that personalisation of news can lead to users feeling trapped in their own filter bubble. Therefore, we want to examine if this is the case in our experiment.

Hypotheses:

Participants in A (content-based algorithm) and C (hybrid CPN recommender algorithm) group (personalised groups) will have an equal mean score on filter bubble measures as the B group (control group).

Week 1

There is no statistically significant relationship between the test group and the filter bubble item (ANOVA, $p = .95$). Hence, in week 1 the above hypothesis can be confirmed.

Week 2

There is no statistically significant relationship between the test group and the filter bubble item (ANOVA, $p = .87$). Hence, in week 2 the above hypothesis can be confirmed.

Week 3

There is no statistically significant relationship between the test group and the filter bubble item (ANOVA, $p = .70$). Hence, in week 3 the above hypothesis can be confirmed.

Week 4

There is no statistically significant relationship between the test group and the filter bubble item (ANOVA, $p = .51$). Hence, in week 4 the above hypothesis can be confirmed.

Overall mean over 4 weeks

There is no statistically significant relationship between the test group and the filter bubble item averaged over the 4 weeks (ANOVA, $p = .80$).

Conclusion filter bubble

Our main conclusion is that in this pilot our groups do not differ with regard to their feeling of being trapped into their own filter bubble. **Hence, what is usually believed as a consequence of news personalisation, namely the filter bubble, cannot be found to be a problem in this pilot study.**



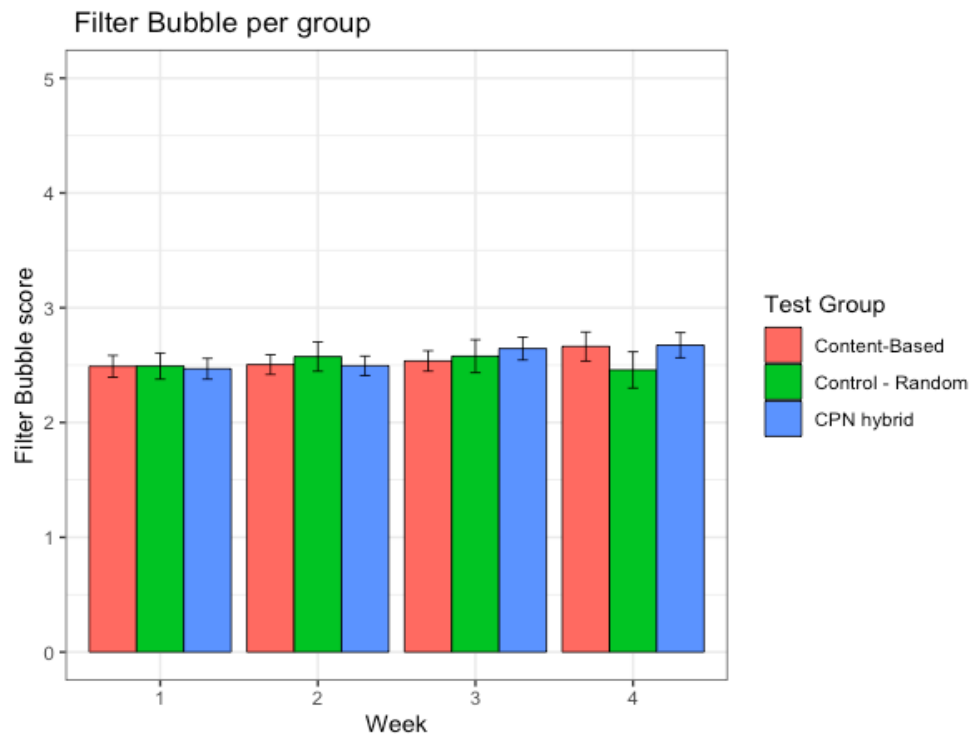


Figure 16: Experience of Filter bubble per week and per group

Extra

Need for news satisfaction on a scale ranging from 0 (not at all satisfied) to 10 (very informed).

- To what extent is your need for news satisfied after using the app?

In week 1, 2, 3 and 4 there are no differences between the groups on how their need for news is satisfied.

Experience of personalisation scale ranging from 1 (totally disagree) to 5 (totally agree)

- I feel that the 'my news' tab contains a personalised news offer for me.

In weeks 1, 2, 3 and 4 there are no differences between the groups on how they feel that the 'my news' tab contained a personalised news offer for them.

This is somewhat surprising as the people in the random recommender group still evenly felt like their news was personalised for them.

Experience of their news offer:

Diverse news in mynews tab

- The news articles that were offered in the 'my news' tab were very diverse.

Only in Week 3, there was a significant difference. Pairwise comparisons showed that people in the control/random group reported having been offered more diverse articles than the group with the content based recommender. This is not surprising, as mynws tab was completely random. Indeed, the random tab has the most diverse recommendation lists and user selections, see section VRT MYNWS user behaviour tracking.

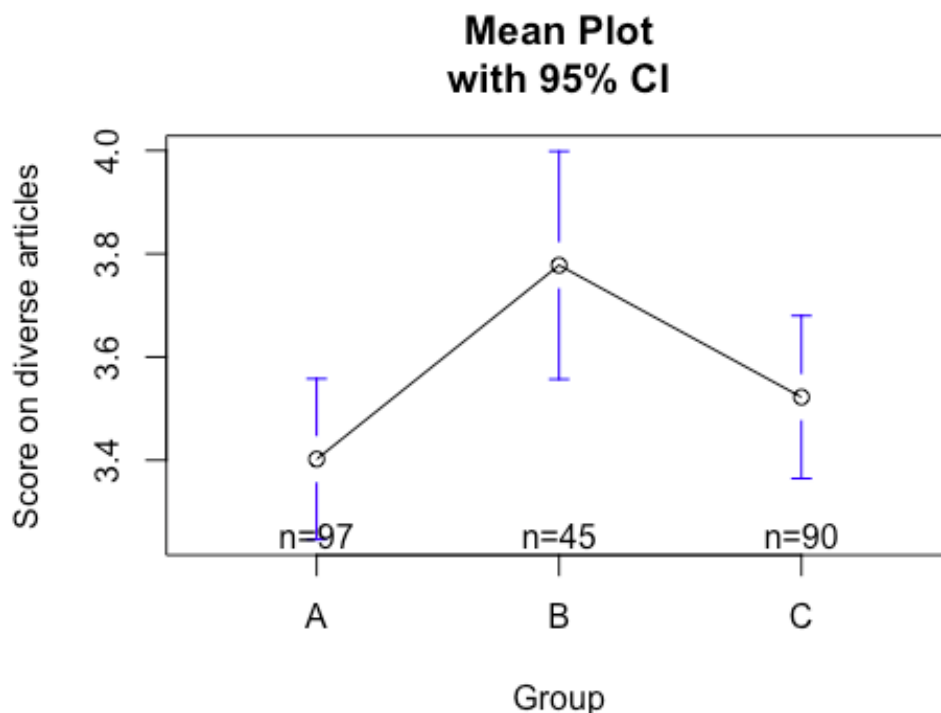


Figure 17: Surprise of items in my nws tab

In week 1, 2, 3 and 4 there are no differences between the groups on how much they were surprised by the articles that appeared in their tab that contained a personalised news offer.

- The list of articles that I received in 'my news' tab met my expectations.

In weeks 1, 2, 3 and 4 there are no differences between the groups on how much the articles in the 'my news' tab met their expectations.

Satisfaction with personalised offer:

- How satisfied are you with your personal list of news articles in the 'my news' tab?

Linear model regressing on Satisfaction with personalised offers. Which items significantly predict the scores on the above satisfaction with your personal list of news articles in the 'my news' tab.



Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	0.64662	0.22668	2.853	0.00473 **
mydata\$T1_gevoel_personalisatie	0.23719	0.04014	5.909	1.2e-08 ***
mydata\$T1_verrast	0.10432	0.03668	2.844	0.00486 **
mydata\$T1_Diversiteit	0.12878	0.05085	2.532	0.01200 *
mydata\$T1_Informed_Ynws	0.18412	0.02439	7.550	1.0e-12 ***

Conclusion: Increasingly being surprised with articles in their personalised feed and increasingly more diversified articles, are related to a higher satisfaction with personal news offer. Also, an increasing feeling that the my news tab contained a personalised news offer was also related to an increased satisfaction with their personal list. The feeling of informedness also positively predicted higher scores on satisfaction with their personalised news offer.

News consumption on other media: scale ranging from 0 (very little) to 10 (very much):

- To what extent have you consulted the news via other news media (such as radio, TV, newspapers and newspaper websites / apps, other news apps, social media such as Twitter, Facebook, Instagram, etc., weekly and monthly newspapers, etc.)?

In week 1, 2, 3 and 4 there are no differences between the groups on how much they consume news on other media platforms.



Drop out survey

Reason - Wat is (zijn) de voornaamste reden(en) waarom u niet verder gegaan bent met het testen van deze app? Meerdere antwoorden aanduiden is mogelijk.

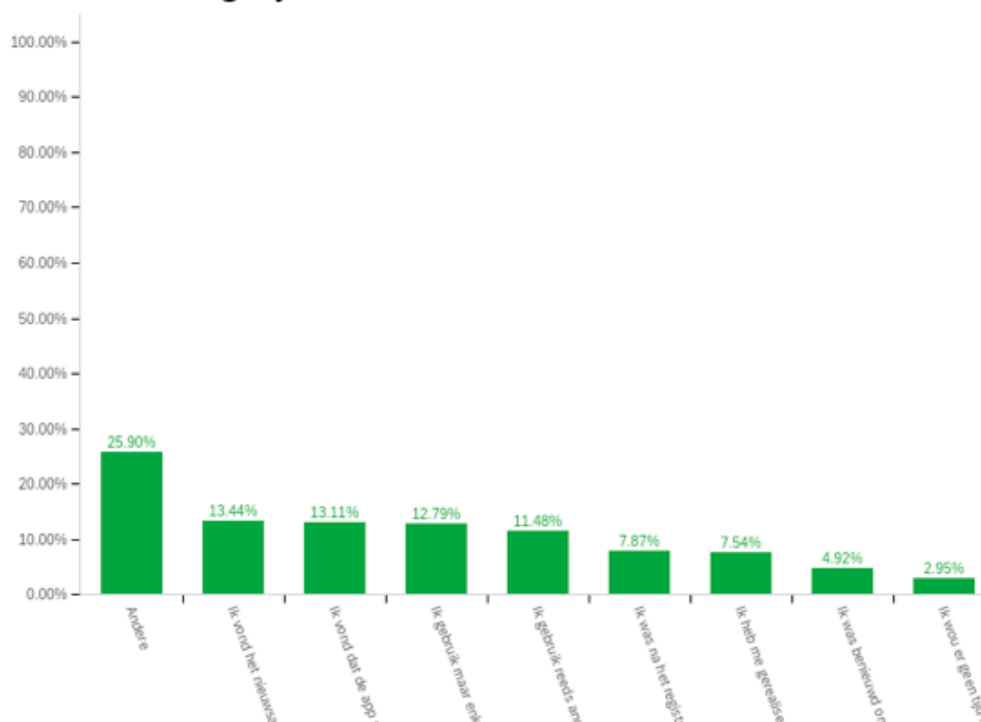


Figure 18: Why are users dropping out?

The four most selected choices for dropping out with very little difference between them were:

- I found the news offer not (sufficiently) personalized
- I thought the app wasn't working well enough
- I only use a few apps and this app is not in my habit of daily use
- I already use other news sites or apps and found this app no added value

End Survey only

- User experience: How satisfied are you with the app in general?

No difference between groups.

- Net Promoter Score: How likely are you to recommend this app to a friend or colleague?



No difference between groups.

- In the CPN app you could read articles from 3 tabs: 'My News', 'Main points' and 'Recent'. How much did you like each steam?

No difference between groups in their liking of the respective tabs.

- How satisfied were you with the relevance of the articles that appeared in each tab?

No difference between groups in their satisfaction of relevance of the respective tabs.

- Where did you usually consult the CPN app?

No difference between groups.

- To what extent do you agree with the following statements?
 - This app is user friendly
 - I find everything I am looking for easily in this app
 - This app is well-arranged
 - This app is visually attractive

No difference between groups for these metrics. This was to be expected, as all VRT testers used the same app in this pilot.

- How would you describe the CPN app?
 - Useless-Useful
 - Very boring-very nice
 - Very exhaustive to work with-very easy to work with
 - Not at all informative-very informative
 - Not reliable at all-very reliable

No difference between groups for these metrics.

- Did the CPN app work properly during the test?

No difference between groups.

- Would you like to use the CPN app even further in the future?

No difference between groups.



- Indicate to what extent news personalization is ...Unnecessary-very useful.

No difference between groups.

4.3.1.3 Survey & behavioural data combined

Informedness and User behaviour

Clicks: No meaningful correlation between feeling of informedness and clicks. There is however a very weak but statistically significant correlation between mean quiz score and clicks, $r = .13$, $p < .01$.

Hence, more clicks is not related to a higher feeling of being informed. However, more clicks is somewhat related with higher quiz scores.

Fraction recommended stream: No meaningful correlation between feeling of informedness or quiz scores and fraction recommended stream.

Read Time: No meaningful correlation between feeling of informedness and Read Time. There is however a very weak but statistically significant correlation between mean quiz score and read time, $r = .10$, $p < .05$.

Hence, an increased reading time is not related to a higher feeling of being informed. But a larger reading time is somewhat related with higher quiz scores.

Scroll depth: No meaningful correlation between feeling of informedness or quiz scores and scroll depth.

FOMO and User behaviour

Clicks: There is no meaningful correlation between FOMO and the number of clicks.

Fraction recommended stream: There is no meaningful correlation between FOMO and the fraction of articles clicked in the mynws tab.

Read Time: There is no meaningful correlation between FOMO and the read time of the articles.

Scroll depth: There is no meaningful correlation between FOMO and the scroll depth of the articles.

Filter Bubble and User behaviour

Clicks: There is a very weak but statistically significant negative correlation between mean Filter bubble scores and clicks, $r = -.09$, $p < .05$. More clicks is somewhat related with having less trouble with the filter bubble.



Fraction recommended stream: There is no meaningful correlation between Filter Bubble and the fraction of articles clicked in the mynews tab.

Read Time: There is no meaningful correlation between Filter Bubble and the read time of the articles.

Scroll depth: There is no meaningful correlation between Filter Bubble and the scroll depth of the articles.

In the below analyses we looked at which survey items are significant predictors of usage data: we included these survey variables:

- *FOMO*
- *Filter bubble*
- *Feeling of receiving personalised news*
- *How diverse they found their news offer*
- *How surprised they were with their news offer*
- *News consumption on other platforms*

Clicks

Which of the items are significant predictors of the amount of clicks?

Higher impression of filter bubble and news consumption on other platforms significantly decrease the number of clicks.

Fraction recommended stream

Which of the items are significant predictors of the fraction of clicks the mynews tab?

An increased feeling of personalization (positive influence) and a decreased impression of the filter bubble (negative influence) are significant predictors of the fraction of clicks the mynews tab.

Read Time

Which of the items are significant predictors of the amount of read time?

An increased feeling of personalization (positive influence) and a decreased diversity (negative influence) are significant predictors of the amount of read time.

Scroll depth

Which of the items are significant predictors of the amount of scroll depth?



An increased feeling of personalization (positive influence) and a decreased diversity (negative influence) are significant predictors of the scroll depth.

4.3.1.4 Overall & practical conclusions

The main aim of this study was to see how our personalisation algorithms can lead to better informed citizens. We looked at behavioural usage data and survey experience data in a live experiment within a specifically designed app for this purpose.

People using the VRT MYNWS app were randomly assigned to one of three groups receiving news in their 'my news' tab via a different way: A: content based recommender, B: random articles/control group and C: A hybrid recommender system based on CPN knowledge.

Analyses from the behavioural data show that

- There is no significant difference in the number of clicks between the groups.
- Users in the hybrid **CPN recommender** group read more from the personalized stream.
- Users in the content based recommender group read longer and they scrolled slightly deeper.
- Users in the hybrid **CPN recommender** group have received articles with the highest diversity in the recommendation lists, and consequently consumed more diversely.
- The hybrid **CPN recommender** recommends the most long-tail articles, but the users in the content based recommender group consumes the items from the long-tail more.

Practical considerations could be that on average a personalized recommendation algorithm yields that articles are read longer by their users. A very important finding is that especially a hybrid CPN recommender algorithm can increase the diversity of articles a user sees in their feed.

A possible important implication for newsrooms is the fact that a recommender can increase the visibility of articles from the long-tail, and thus can thicken the long tail. In the absence of the recommender system, many articles are less read than a few very highly read articles. Increasing the visibility of the long tail articles can possibly be a very positive implication for both the newsroom (more diverse news and therefore more people coming to their news platform) and the reader (more choice of interesting articles that are normally less visible on the platform).

Analyses from the survey data show that

- There is no difference in the feeling of informedness or quiz scores between the groups
- There is no difference in the fear of missing out between the groups



- There is no difference in the impression of being put in a filter bubble between the groups

We can thus conclude that newsrooms and readers should not really be afraid of the filter bubble and fear of missing out. When a news app provides a specific personalised news tab above the usual tabs users in this pilot we can consider FOMO and the filter bubble problem not really as problematic here. *It is probably more important to change how people think about the filter bubble, than fighting the filter bubble itself.*

Additional analyses show that increasingly being surprised with articles in their personalised feed and increasingly more diversified articles, are related to a higher satisfaction with their personal news offer. Also, an increasing feeling that the ‘my news’ tab contained a personalised news offer was also related to an increased satisfaction with their personal list. The feeling of informedness also positively predicted higher scores on satisfaction with their personalised news offer.

4.3.2 Open Pilot / DW

The setup of DW open pilot 3 has been slightly different from VRT’s one. In this setup we evaluated the result of the CPN recommender against a Most-popular based recommender system.

The reason for setup differences can be explained as follows:

- VRT users have used a dedicated app, different from the official CPN app and therefore had a different user experience that has needed a specific configuration of the recommender and a different component for collecting user behavioural data
- Research questions for VRT were oriented to test a broader number of aspects such as long-tail articles consumption and recommendation diversity
- We wanted to test the CPN recommender in different setups in order to verify its adaptability to different contexts and editorial realities.

Participants to the pilot were assigned, upon registration, to two different groups:

- Control Group (CG) participants received most-popular based recommendations for the whole duration of the pilot (i.e. the articles that users are globally reading the most). The choice of this particular type of recommender (that is currently the most used across media companies) was due to the fact that it generally performs good on average but fails to capture the interest of specific groups of users (long tail effect) that, instead, is exactly the effect that we want to achieve by using our CPN recommender.
- Personalized Group users (PG) were instead receiving the regular CPN recommendations.
- Behavioural data of users are collected in the form of events such as user clicks, accessing personalized tab, reading time, etc.



4.3.2.1 Quantitative analysis

In the table below the result of the analysis of behavioural data is shown.

Table 10: Behavioural data DW

CG size	PG size	CG Avg number of clicks	PG Avg number of clicks	Increment of PG over CG	p-value
99	114	17.74	26.97	+51%	0.06

The table reports the difference in the click behaviour of users in the Control Group and in the Personalized Group. Users in the PG were consuming 51% more articles than users in the CG. To be sure that this result was not influenced by chance in the assignment of users to the groups we performed strong statistical tests on the data collected that resulted in estimating the p-value in 0.06; such low p-value (very near to the ideal 0.05 generally used in literature) is proving that the impact of the CPN recommender on the increment of article consumption has definitely been effective.

4.3.2.2 Weekly surveys

The pop-up for the weekly surveys for DW appeared on Monday in the CPN app for a duration of four weeks (four weekly surveys in total). We recorded 38 responses to the weekly survey for DW in Qualtrics. Four responses were test users and were excluded from the data-analysis. We also removed the responses that were registered in Qualtrics as ‘finished’ = ‘false’ (five responses). Correspondingly, we consider 29 responses (‘finished’ = ‘true’) as the final response count for the DW weekly surveys²⁰.

The table below shows the **sociodemographic data** of the survey respondents of the weekly DW surveys.

Table 11: Sociodemographic data of the DW weekly survey respondents

Total response count	Gender	Age	Education
29	Male: 24 Female: 5	Mean age: 47 Minimum: 25 Maximum: 75	High school degree: 5 Higher education degree: 24

²⁰ The ‘finished’ column in Qualtrics datasets details whether the response was submitted or closed. ‘True’ indicates that the respondent reached an end point in their survey (hitting the submit-button). ‘False’ indicates that the respondent left their survey before reaching an end point and the response was instead closed manually or due to session expiration. Source: <https://www.qualtrics.com/support/survey-platform/data-and-analysis-module/data/download-data/understanding-your-dataset/>



We recorded **21 responses** to the first weekly survey (10-16 February), three responses to the second weekly survey (17-23 February), four responses to the third weekly survey (24 February – 1 March), and one response to the fourth weekly survey (2-8 March). Of the people who completed the first weekly survey, ten users were in the personalised group and eleven users were in the control group. Correspondingly, **we descriptively analysed and compared the results of the personalised group with the control group for the first weekly survey**. There are too few responses to the second, third, and fourth weekly surveys of DW to compare the findings between the control and personalised group. Consequently, we excluded these responses from the data-analysis and reporting. We analysed and reported the weekly survey results in a descriptive manner since we were unable to perform statistical analysis due to the low response count of the weekly surveys.

Subjective feeling of being informed

The DW respondents in the personalised group indicate that they subjectively felt informed after reading the ‘my news’ tab with an average score of 7,5/10 (ten responses). In addition, the DW respondents in the control group also answered they felt informed with an average score of 7,73/10 (eleven responses). Consequently, based on the findings of the first weekly survey we conclude that **both the personalised group and the control group subjectively felt informed after reading the ‘my news’ tab but the DW respondents in the control group felt more informed than DW respondents in the personalised group** (Figure below).

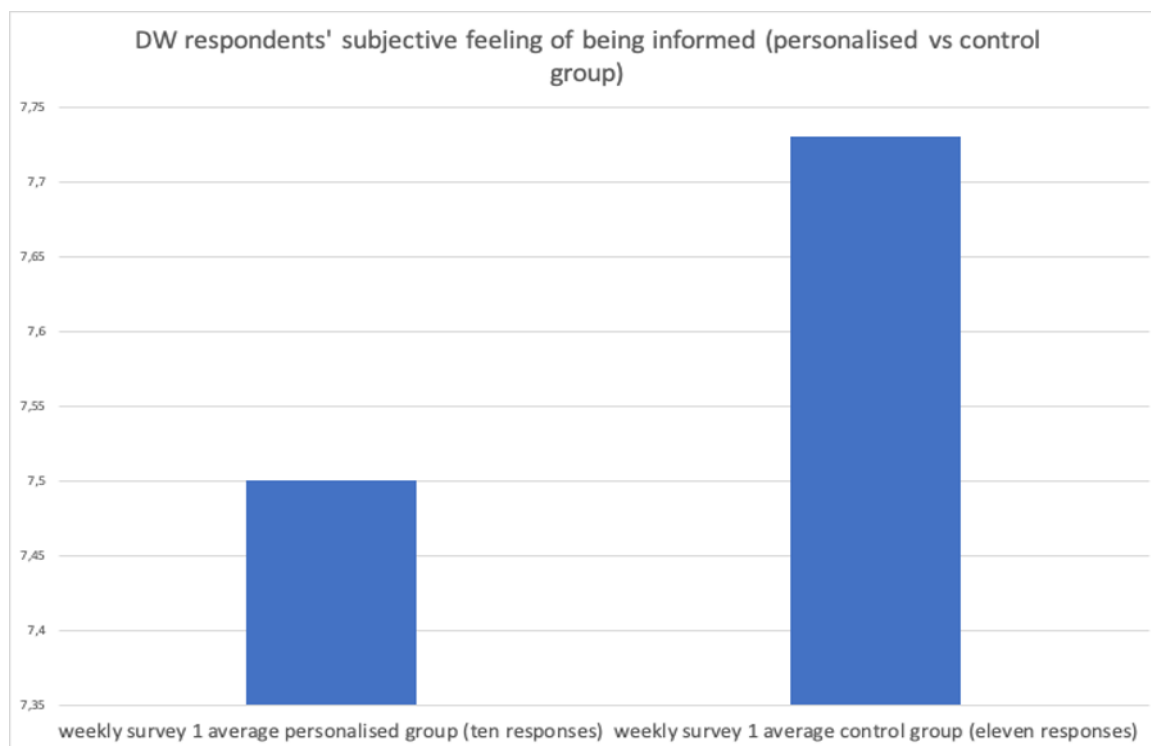


Figure 19: DW respondents' subjective feeling of being informed (personalised vs control group) - first weekly survey results



Satisfaction of the need for news

The DW respondents in the personalised group indicate that their need for news is satisfied after using the app with an average score of 7,4/10 (ten responses), on a scale ranging from 0 (not at all satisfied) to 10 (highly satisfied). The DW respondents in the control group also stated their need for news was satisfied with an average score of 7,6/10 (ten responses). Consequently, based on the findings of the first weekly survey we conclude that **both the DW respondents in the personalised group and the control group their need for news was satisfied after using the app but the need for news of the control group was more satisfied than the need for news of the respondents in the personalised group** (Figure below).

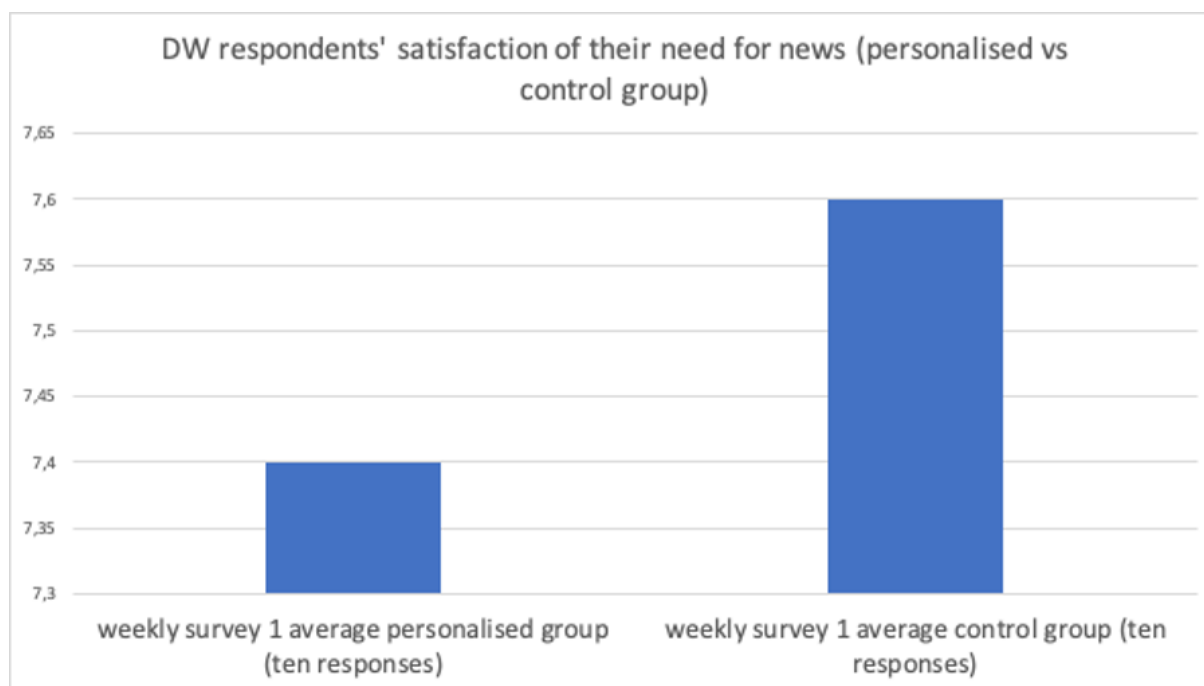


Figure 20: DW respondents' satisfaction of their need for news (personalised vs control group) - weekly survey 1 results

Fear of missing out

We asked the respondents to what extent they agree with the following statements, on a scale ranging from 1 (I highly disagree) to 5 (I highly agree):

- I believe I would have missed something if I only read my personalized news offer in the 'my news' tab;
- I experience fear of missing important news while using this app.

Nine respondents of the **personalised group** completed these questions (Figure below):

- Purple label: Most respondents in the personalised group feel neutral towards the statement that they would have missed something if they only read the personalised



news offer in the ‘my news’ tab (four responses, 44,44%). Three respondents somewhat agree (33,33%) and two respondents highly agree (22,22%).

- Blue label: Most respondents in the personalised group (4 responses, 44,44%) feel neutral towards the statement that they experienced fear of missing out while using this app (blue label). Two respondents somewhat agree (22,22%), while one respondent somewhat disagrees (11,11%), and two respondents highly disagree (22,22%).

Fear of missing out (personalised group)

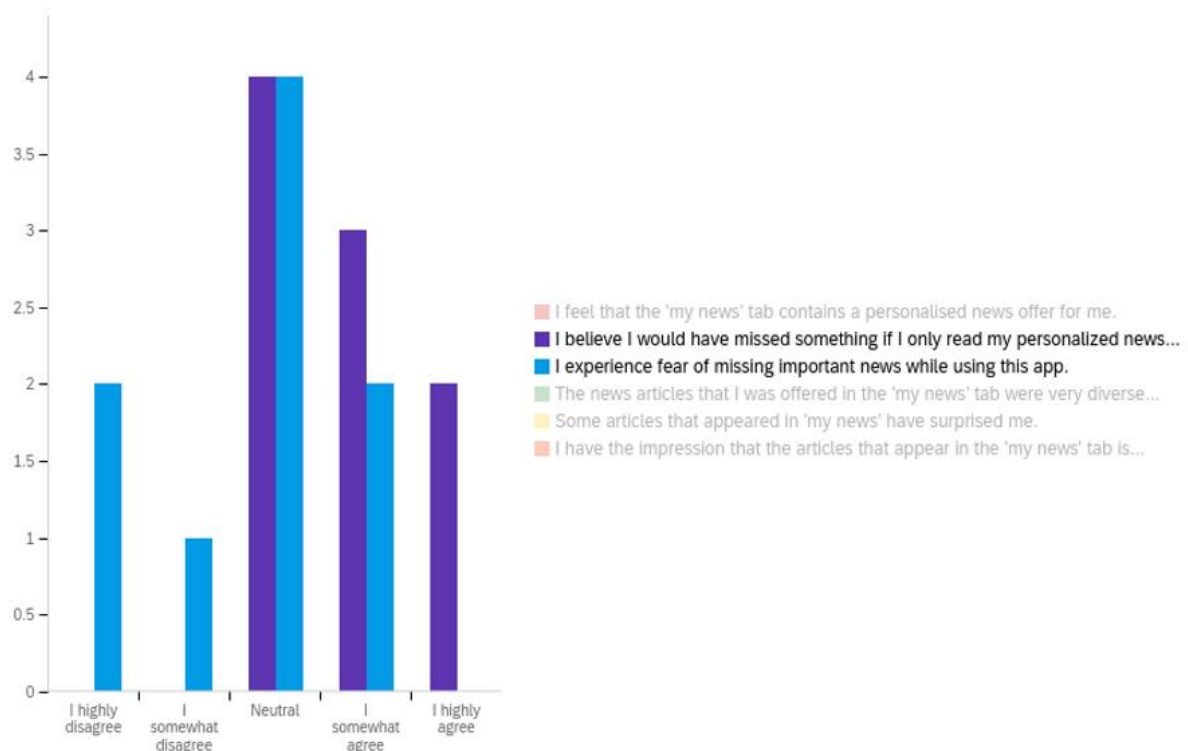


Figure 21: DW respondents' experience of fear of missing out (personalised group)

Ten respondents of the DW **control group** answered these questions:

- Purple label: Four respondents of the control group (40%) feel neutral towards the statement that they would have missed something if they only read the personalised news offer in the ‘my news’ tab. On the other hand, four respondents somewhat agree (40%). One respondent highly agrees (10%), while one respondent highly disagrees (10%).
- Blue label: Furthermore, seven of ten respondents of the DW control group (70%) feel neutral towards the statement that they experienced fear of missing important news while using the app. Two respondents somewhat agree (20%), while one respondent somewhat disagrees (10%).

Fear of missing out (control group)

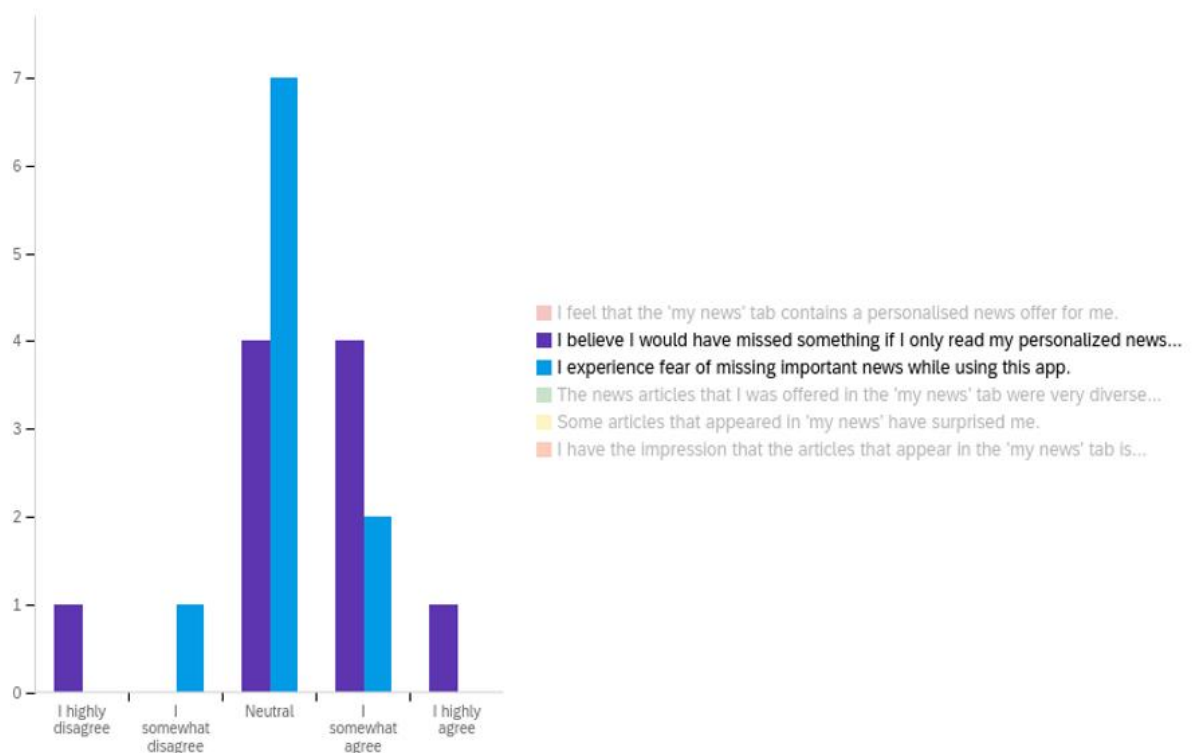


Figure 22: DW respondents' experience of fear of missing out (control group)

Filter bubble

We inquired from the respondents to what extent they agree that the articles appearing in the 'my news' tab isolated them in their own cultural or ideological bubble, on a scale ranging from 1 'I highly disagree' to 5 'I highly agree'.

Nine respondents of the **personalised group** completed this question (Figure below). Most DW respondents in the personalised group somewhat agree that the articles appearing in the 'my news' tab isolate them in a filter bubble (four responses, 44,44%). One respondent feels neutral towards this statement (11,11%), while three respondents somewhat disagree (33,33%), and one respondent highly disagrees (11,11%).

Filter bubble (personalised group)

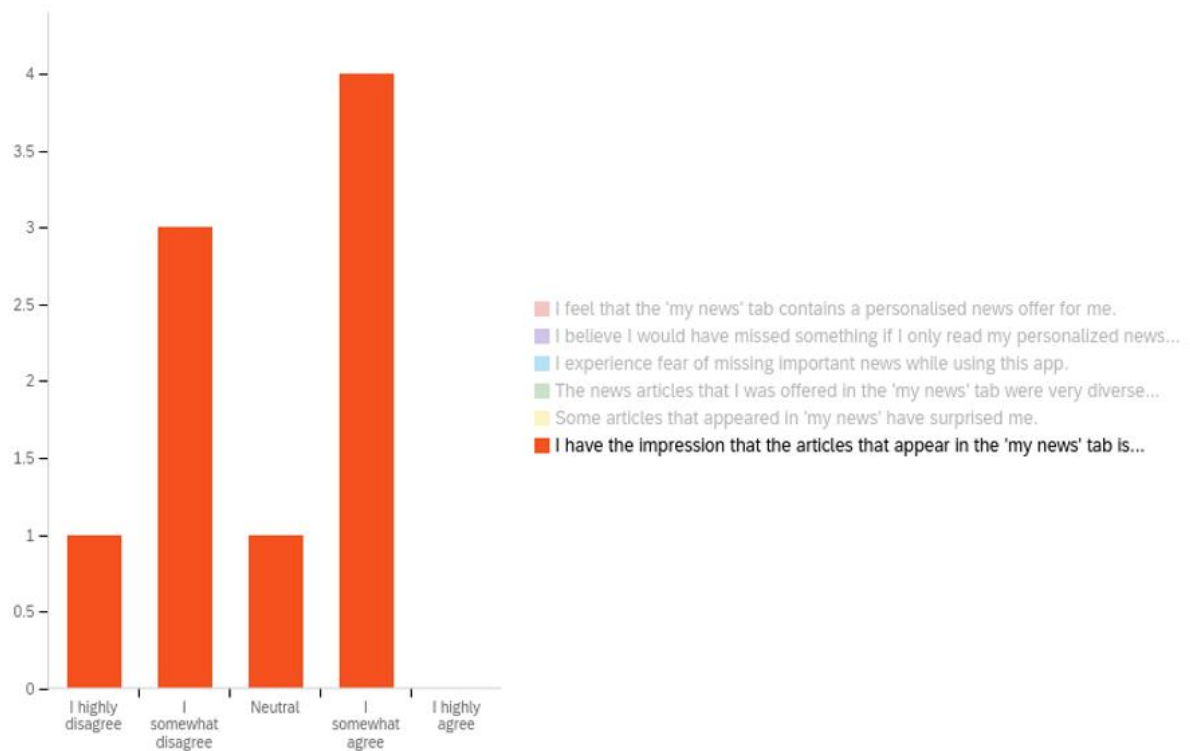


Figure 23: DW respondents' perception of filter bubble (personalised group)

Ten respondents of the **control group** completed this question (Figure below). Five of ten respondents of the DW control group (50%) feel neutral towards the statement that they had the impression that the articles that appeared in the 'my news' tab isolated them in their own cultural or ideological bubble. Two respondents somewhat agree (20%), one respondent highly agrees (10%), while two respondents somewhat disagree (20%).

Filter bubble (control group)

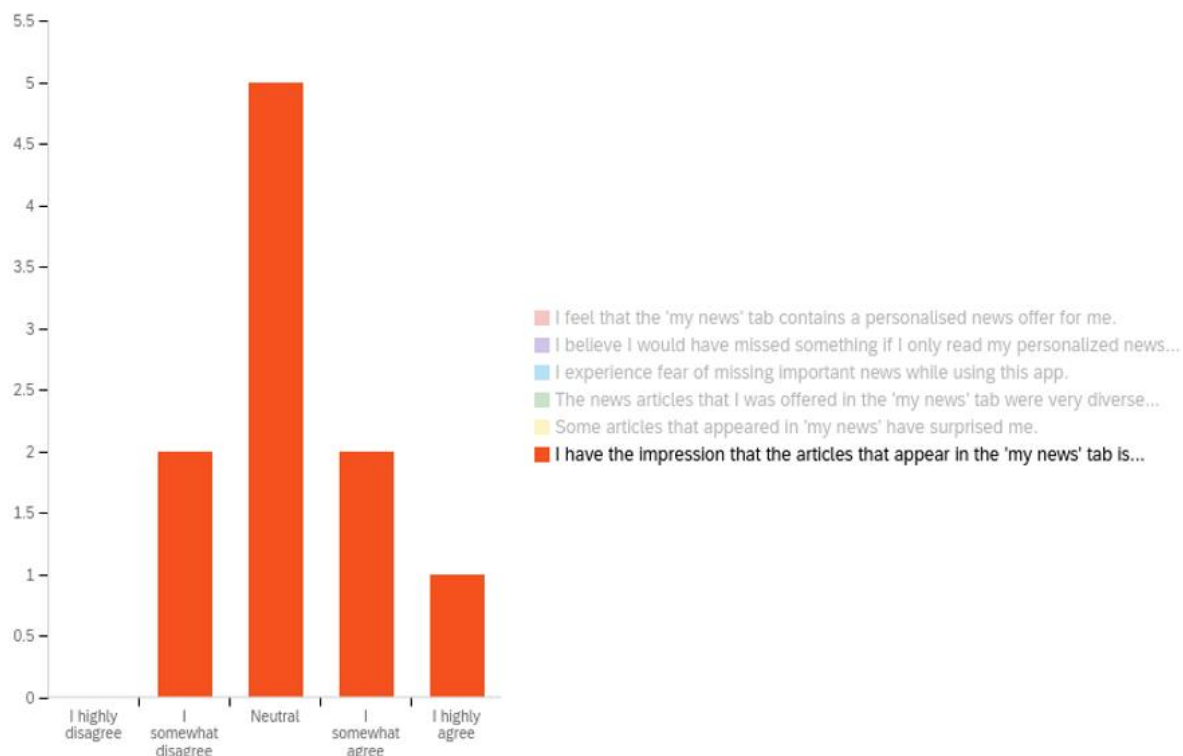


Figure 24: DW respondents' perception of filter bubble (personalised group)

Experience of the news offer

Nine respondents of the **personalised group** indicated how they experienced the news offers in terms of diversity and being surprised. Ten respondents indicated how often the personalised news offer surprised them and to what extent the personalised news articles fulfilled their news expectations:

- Green label: Most DW respondents in the personalised group feel neutral towards the statement that the news articles in the 'my news' tab were very diverse (six of nine responses, 66,67%). Two respondents somewhat agree (22,22%), while one respondent somewhat disagrees (11,11%).
- Yellow label: Most respondents in the personalised group feel neutral towards the statement that some of the articles that appeared in the 'my news' tab have surprised them (six of nine responses, 66,67%). One respondent somewhat agrees (11,11%), while one respondent somewhat disagrees (11,11%), and one respondent highly agrees (11,11%).
- Red label: When inquired how often the articles in the 'my news' tab have surprised them, most DW respondents in the personalised group answered 'sometimes' (six of ten responses, 60%). One respondent said 'most of the time' (10%), while three respondents answered 'never' (30%).



- Purple label: Six of ten respondents (60%) indicated that the list of articles in the ‘my news’ tab met their expectations ‘most of the time’ (purple label). Two respondents said ‘about half of the time’ (20%) and one respondent answered ‘sometimes’ (10%).

Experience of the news offer: diversity and subjective feeling of being surprised (personalised group)

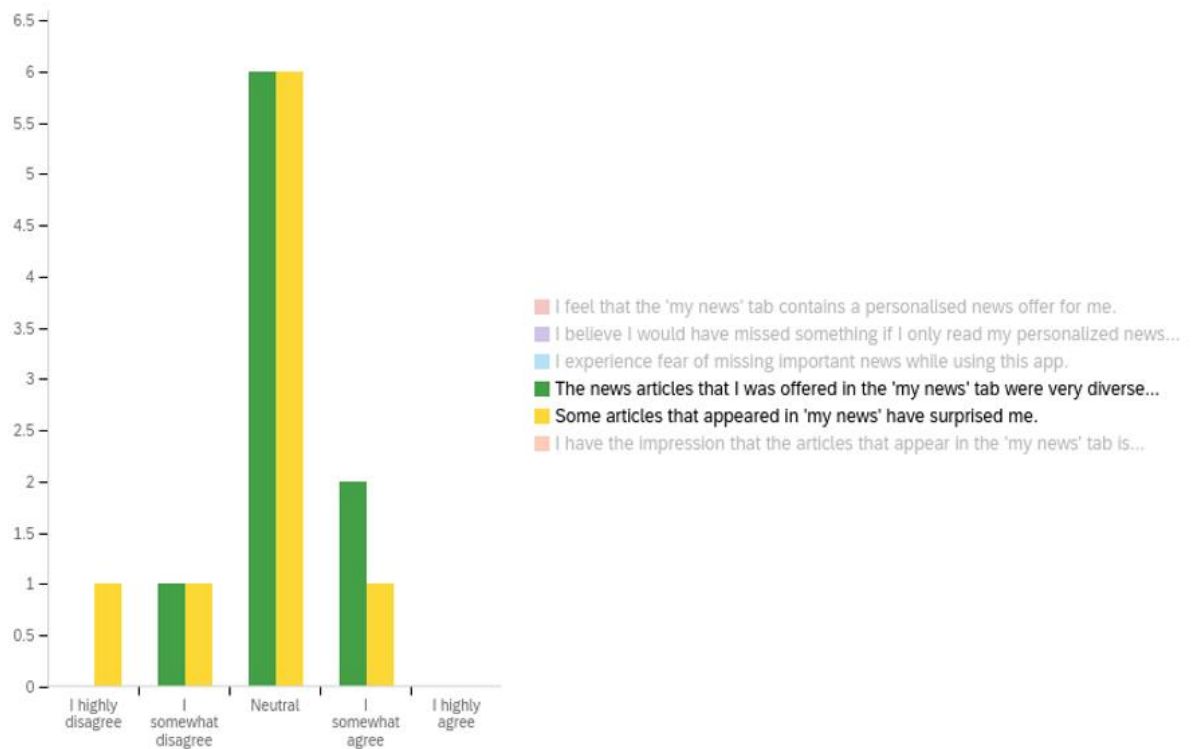


Figure 25: Diversity and subjective feeling of being surprised (DW respondents – personalised group)

Experience of the news offer: subjective feeling of being surprised and fulfilment of expectations (DW personalised group)



Figure 26: Subjective feeling of being surprised and fulfilment of expectations (DW respondents personalised group)

Ten respondents of the **control group** indicated how they experienced the news offers in terms of diversity, being surprised, how often the personalised news offer surprised them, and to what extent the personalised news articles fulfilled their news expectations (Figures X and X):

- Green label: Eight of ten respondents of the DW control group (80%) feel neutral towards the statement that the news articles in the 'my news' tab were very diverse. One respondent highly agrees (10%) while one respondent somewhat disagrees (10%).
- Yellow label: Six of ten respondents of the DW control group (60%) feel neutral towards the statement that some articles that appeared in the 'my news' tab have surprised them.
- Red label: Seven of ten respondents of the DW control group (70%) indicate that the articles that appeared in the 'my news' tab have surprised them 'sometimes'. One respondent said 'never' (10%), one respondent answered 'about half of the time' (10%), and one respondent indicated 'most of the time' (10%).
- Purple label: Seven of ten respondents of the DW control group (70%) state that the list of articles in the 'my news' tab met their expectations. Three respondents answered 'sometimes' (30%).



Experience of the news offer: diversity and subjective feeling of being surprised (control group)

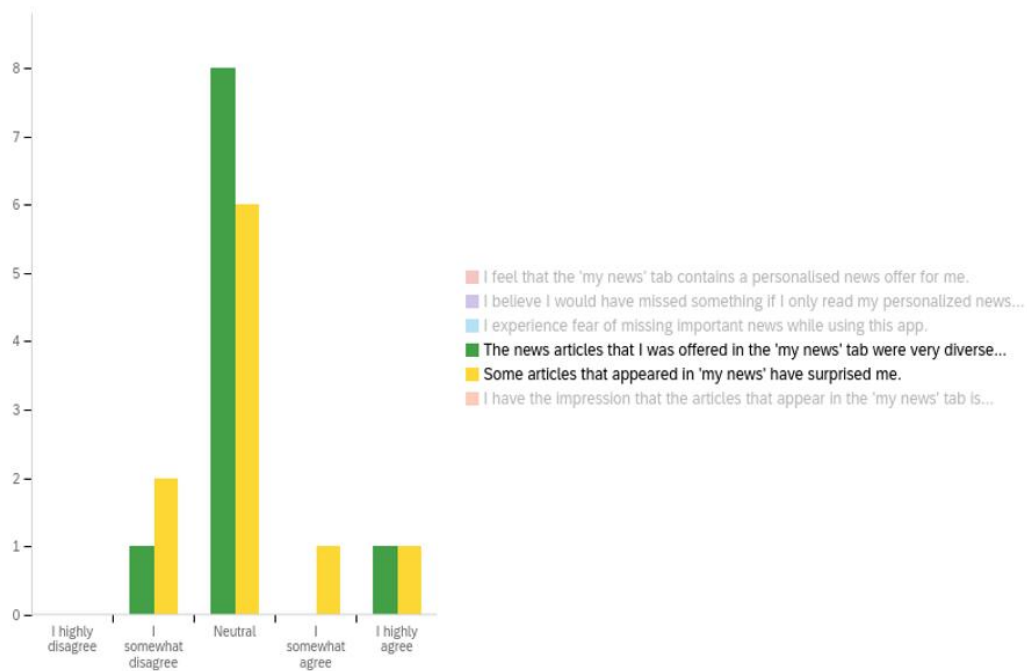


Figure 27: Diversity and subjective feeling of being surprised (DW respondents – control group)

Experience of the news offer: subjective feeling of being surprised and fulfilment of expectations (DW control group)

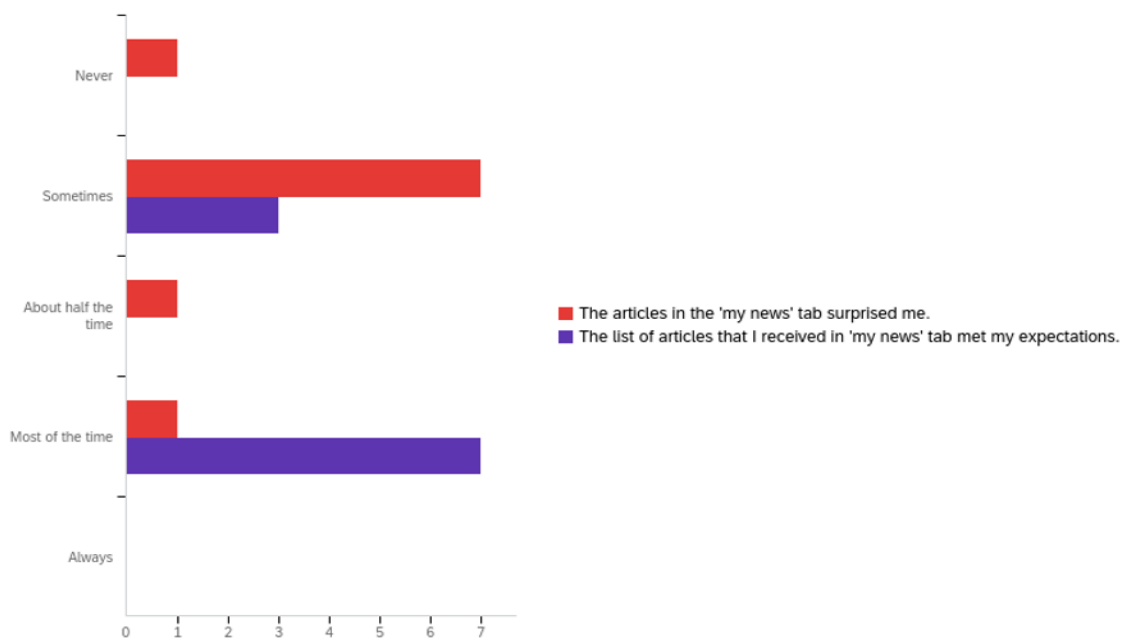


Figure 28: Subjective feeling of being surprised and fulfilment of expectations (DW respondents personalised group)



Experience of personalisation

Ten DW respondents of the **personalised group** indicated to what extent they experienced that the articles in the ‘my news’ tab were personalised. Most respondents in the personalised group somewhat agree that the ‘my news’ tab contains a personalised offer for them (six of ten responses, 60%). Two respondents highly agree (20%), one respondent feels neutral towards the statement (10%), and one respondent somewhat disagrees (10%).

Experience of personalisation (personalised group)

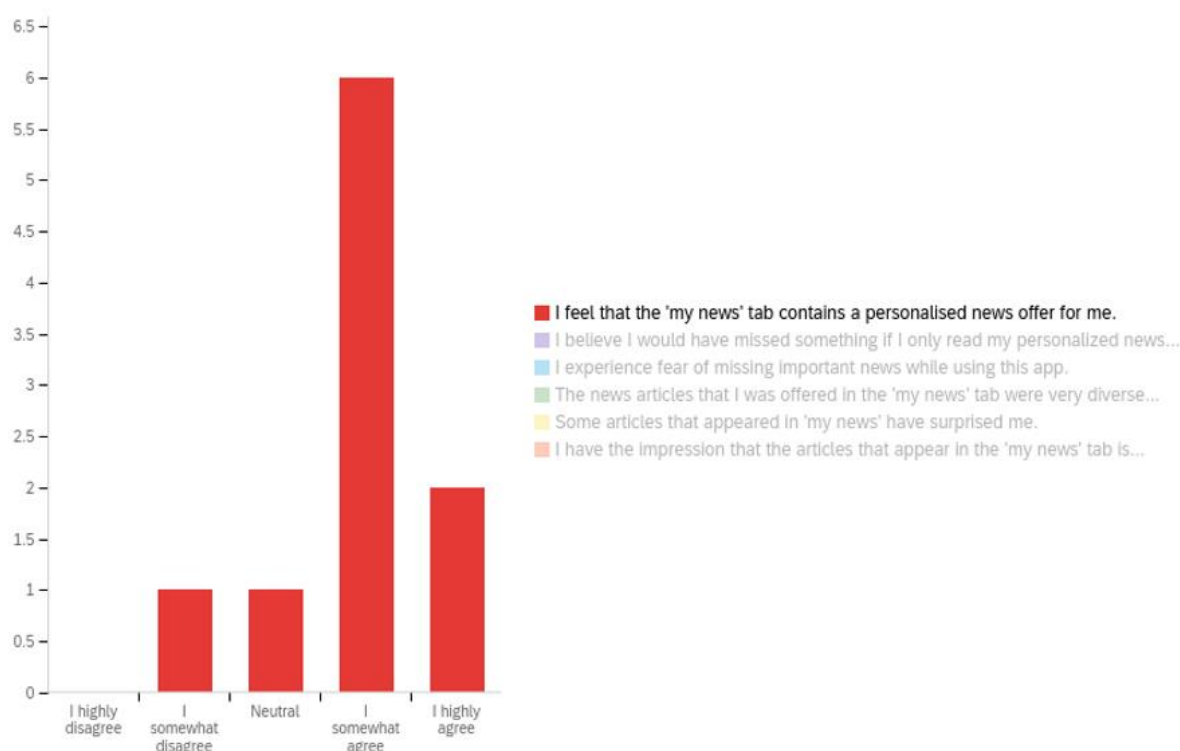


Figure 29: DW respondents experience of personalisation (personalised group)

Ten DW respondents of the **control group** indicated to what extent they experienced that the articles in the ‘my news’ tab were personalised. Five of ten respondents (50%) somewhat agree that the ‘my news’ tab contained a personalised offer for them. One respondent highly agrees (10%), three respondents feel neutral towards the statement (30%), and one respondent somewhat disagrees (10%).

Experience of personalisation (control group)

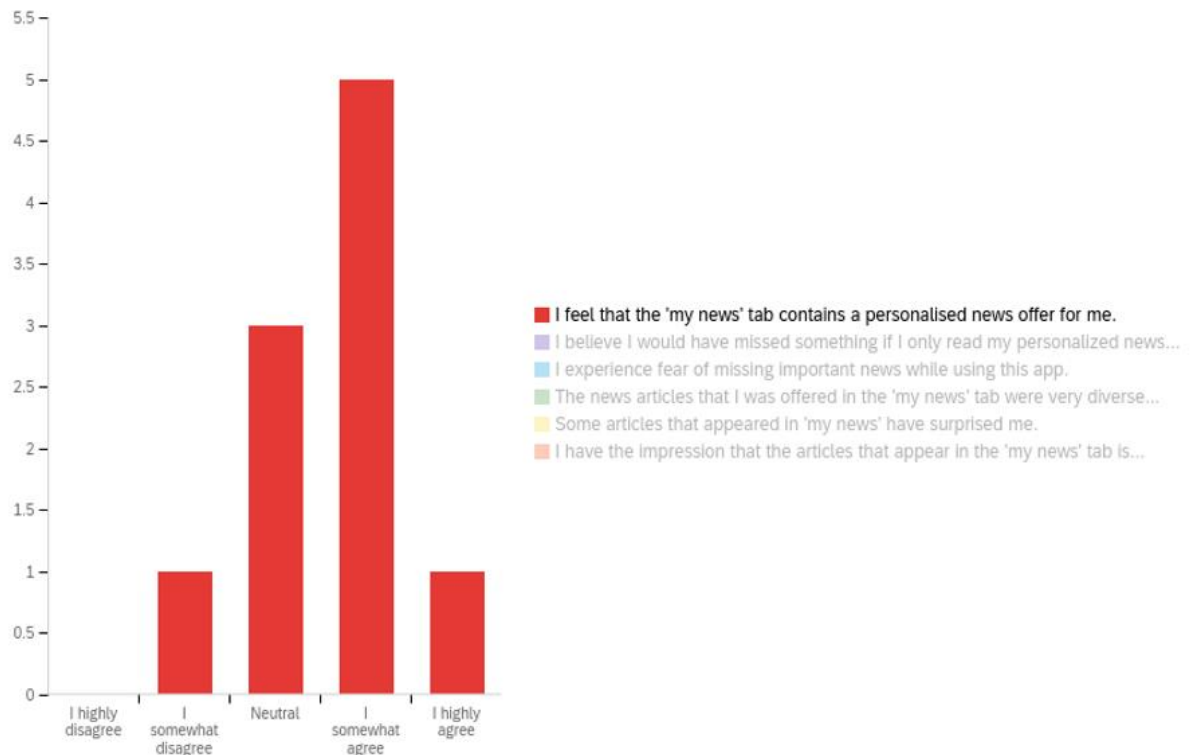


Figure 30: DW respondents experience of personalisation (control group)

Satisfaction with personalised news offer

Seven respondents of the **personalised group** indicated to what extent they were satisfied with the personalized news offer in the ‘my news’ tab. Most DW respondents in the personalised group were moderately satisfied with the list of personalised news articles in the ‘my news’ tab (five of seven responses, 71,43%). One respondent was slightly satisfied (14,29%) and one respondent was extremely satisfied (14,29%).

Satisfaction with the personalised news articles in the 'my news' tab (personalised group)

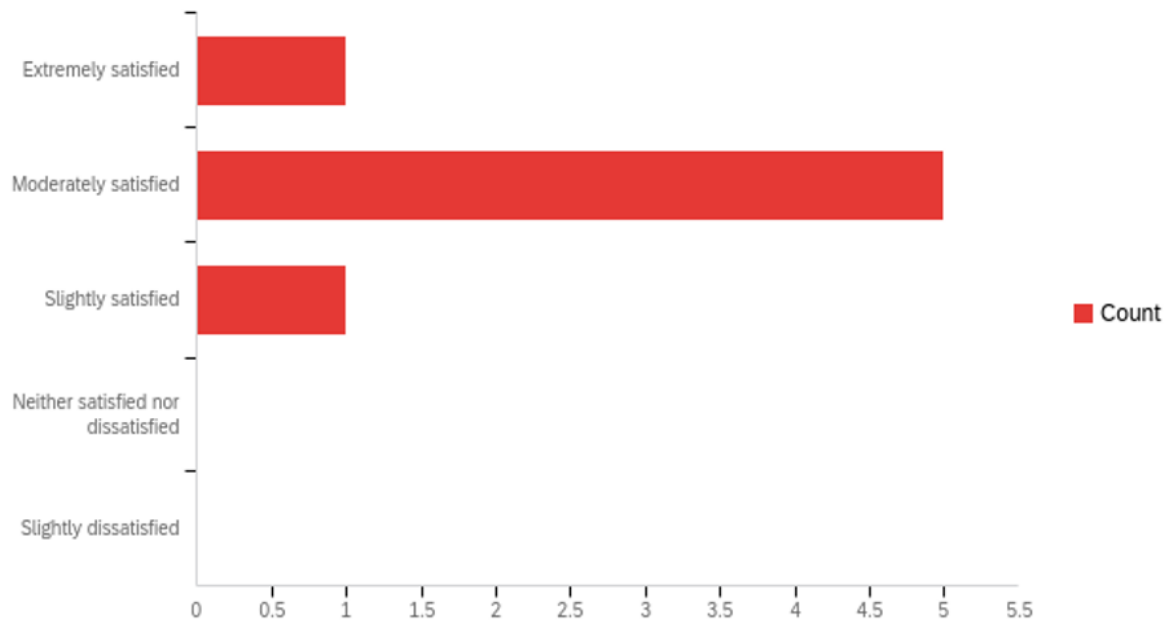


Figure 31: DW respondents' satisfaction with the personalised news offer (personalised group)

Ten respondents of the **control group** indicated to what extent they were satisfied with the personalized news offer in the 'my news' tab. Three of ten respondents in the DW control group (30%) indicate that they are extremely satisfied with the personalised articles in the 'my news' tab, three respondents (30%) state they are 'moderately satisfied', and three respondents (30%) are 'slightly satisfied'. One respondent answered they are neither satisfied nor dissatisfied (10%).

Satisfaction with the personalised news articles in the 'my news' tab (personalised group)

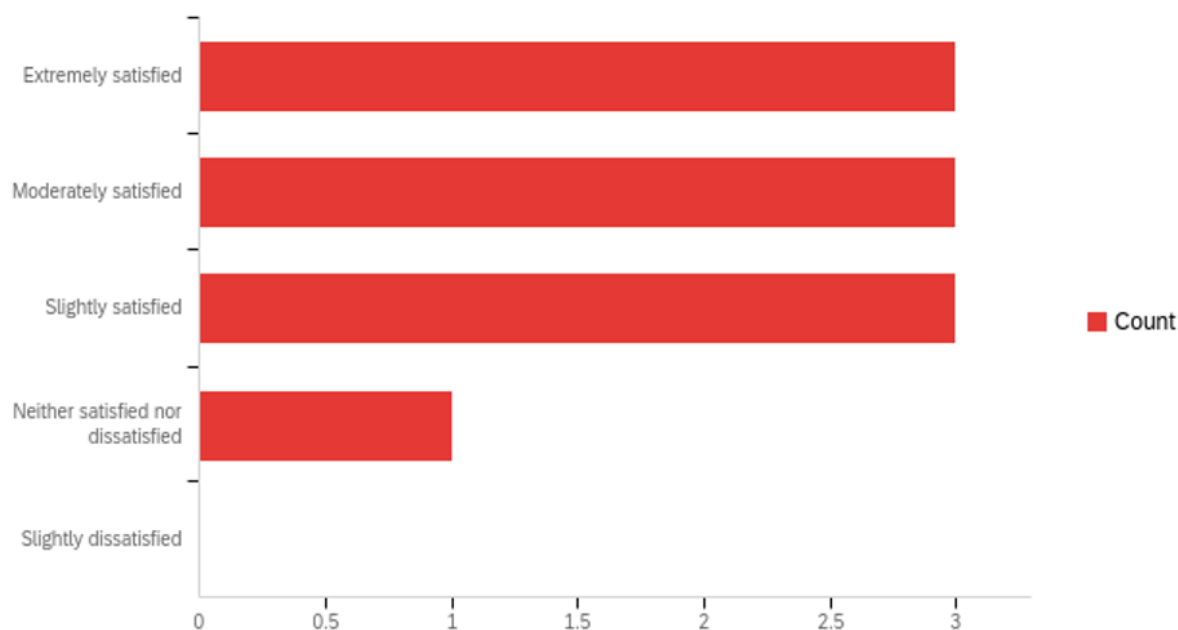


Figure 32: DW respondents' satisfaction with the personalised news offer (personalised group)

News consultation via other news media

The DW respondents in the personalised group indicated with an average score of 7,11/10 that they frequently consulted news via other news media (9 responses). In addition, DW respondents in the control group also frequently consulted news via other news media (10 responses, average score of 8,2/10). We conclude that the **DW respondents in the control group consulted news via other news media more frequently than DW respondents in the personalised group.**

4.3.2.3 Final survey

We recorded eleven responses to the final survey for DW in Qualtrics. We excluded five responses registered as 'finished' = 'false' from the data-analysis. We consider **six responses** ('finished' = 'true') as the final response count for the final survey for DW. We analysed and reported the final survey findings on a descriptive level since we were unable to perform further statistical analysis due to the low response count of the final DW survey. In addition, there are too few responses to the final survey of DW to compare the findings between the control and personalised group. Consequently, we discuss the results on an overarching level (responses of personalised group and control group combined).

Evaluation of the personal data receipt

We inquired from the respondents to what extent they perceive the personal data receipt (PDR) as a transparent approach towards data collection and processing. The question-type was a Net Promoter Score (NPS). This is a metric to measure user experience of and



perception towards a certain business, product or service. Respondents gave a rating between 0 (not at all transparent) and 10 (very transparent) and, depending on their response, respondents fall into one of three categories to establish an NPS-score:

- **Promoters:** score 9 or 10 and are typically loyal and enthusiastic users;
- **Passives:** score 7 or 8 and are satisfied with the service, but not happy enough to be considered promoters;
- **Detractors:** score 0 to 6 and are unhappy users who are unlikely to use the service again, and may even discourage others from using it²¹.

The NPS-score is reported with a number between -100 to +100, a higher score is desirable. If the score is below 0, we consider this a *low* NPS-score, a score between 0 and 30 is considered a *medium* NPS-score, and a score between 30 and 100 is a *good* NPS-score²².

Four of six respondents completed this question:

- Two respondents perceive the personal data receipt as a transparent approach towards data collection and processing (50%). These respondents score the PDR 9/10 and 10/10. Correspondingly, they are considered *promoters*. When asked to explain their answer, both respondents mention that the PDR is “very transparent” but they do not explain why.
- On the other hand, two respondents (50%) do not evaluate the PDR as a transparent approach and are considered *detractors*. These respondents score the PDR 4/10 and 5/10 but do not explain why.

In conclusion, the DW respondents’ NPS-score for the personal data receipt is 0 (% promoters - % detractors) and is therefore considered as a *medium* rating.

To what extent did you perceive the personal data receipt as a transparent approach towards data collection and processing?

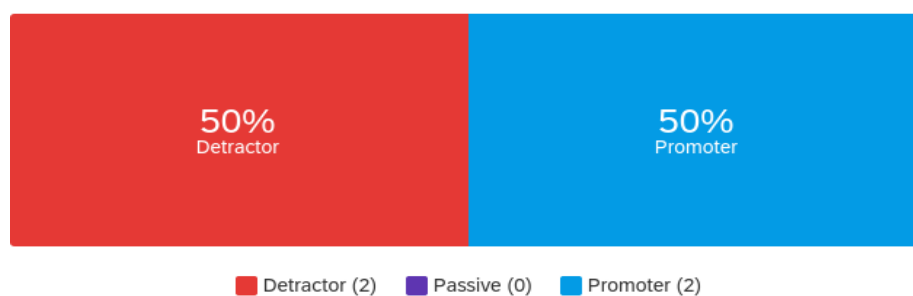


Figure 33: DW respondents’ evaluation of the personal data receipt

²¹ <https://www.qualtrics.com/uk/experience-management/customer/net-promoter-score/>

²² <https://www.retently.com/blog/good-net-promoter-score/>

Evaluation of the individual news streams

The respondents indicated to what extent they liked each news stream on a scale ranging from 0 (dislike) to 10 (like). Six respondents completed this question. The **'main points'** news stream was the most liked tab and received an average score of 5,17/10, while the **'my news'** stream was negatively evaluated (average score 4/10). The respondents scored the **'recent'** news stream on average 5/10.

Satisfaction of the need for news

We inquired from the respondents to what extent their need for news was satisfied after using the app, on a scale ranging from 0 (not at all satisfied) to 10 (highly satisfied). Six respondents answered this question. An average score of 4,17/10 indicates that the respondents' need for news was not satisfied after using the app.

Subjective feeling of being informed

The respondents (four responses) indicate that they did not feel informed after reading the **'my news'** tab with an average score of 2,75/10, on a scale ranging from 0 (not informed) to 10 (very informed).

Satisfaction with the relevance of the individual news streams

We asked the respondents to indicate how satisfied they were with the relevance of the news articles that appeared in each tab, on a scale ranging from 1 (extremely satisfied) to 5 (extremely dissatisfied). Six respondents answered this question:

- Red label: Most respondents are somewhat satisfied with the relevance of the articles in the **'my news'** tab (four responses, 66,67%), one respondent is extremely satisfied (16,67%), and one respondent is neither satisfied nor dissatisfied (16,67%).
- Purple label: Three respondents (50%) are somewhat satisfied with the relevance of the news articles in the **'main points'** stream, while two respondents are neither satisfied nor dissatisfied (33,33%), and one respondent is extremely dissatisfied (16,67%).
- Blue label: One respondent (16,67%) was somewhat satisfied with the relevance of the articles in the **'recent'** stream, while two respondents are neither satisfied nor dissatisfied (33,33%), two respondents are somewhat dissatisfied (33,33%), and one respondent is extremely dissatisfied (16,67%).

We conclude that the relevance of the articles in the **'my news'** was the most positively evaluated of all the individual news streams by DW respondents, while the **'recent'** tab was most negatively evaluated.



How satisfied were you with the relevance of the articles that appeared in each tab?

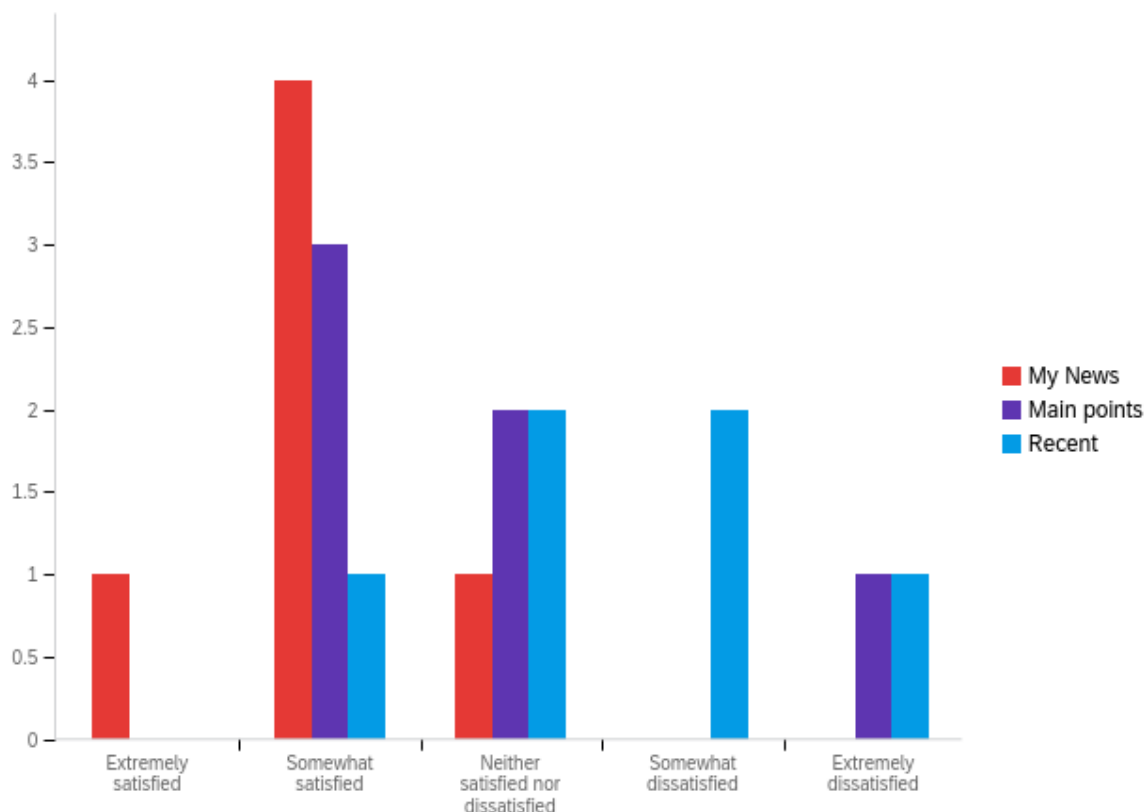


Figure 34: DW respondents' satisfaction with the relevance of the individual news stream

Attitude towards news personalisation

We inquired from the respondents their attitude towards news personalisation in general. Six respondents answered the question:

- Two respondents (33%) are enthusiastic about news personalisation and think it is very useful. These respondents scored news personalization 9/10 and 10/10, they are therefore labelled as *promoters*.
- Two respondents (33%) scored news personalization 7/10 and 8/10. These respondents are considered to be *passives* and they are satisfied with news personalisation but not happy enough to be *promoters*.
- Two respondents (33%) scored news personalization 4/10 and 5/10. Consequently, these respondents are *passives*. They are unhappy about news personalisation, are unlikely to use it again, and may even discourage others from trying it.

We conclude that DW respondents' assign a *medium* rating to news personalisation, the NPS-score is 0 (% promoters - % detractors).



Indicate (rank) to what extent news personalization is unnecessary vs. very useful?

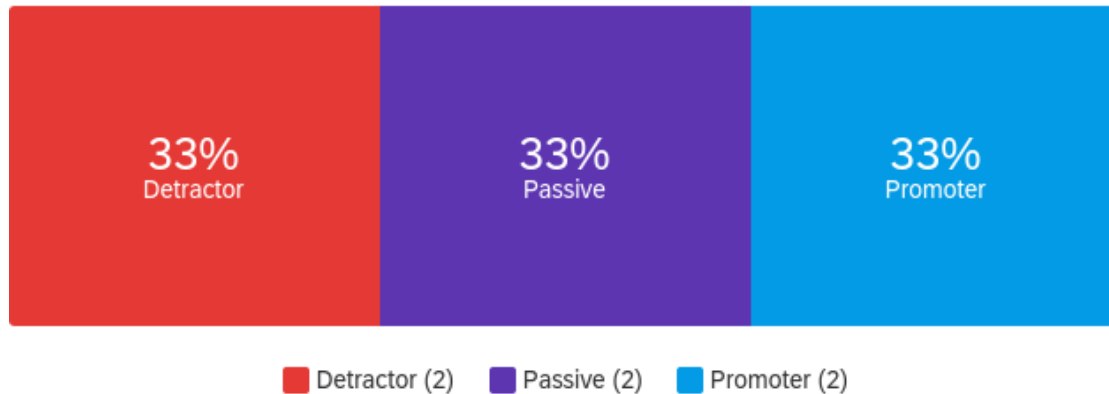


Figure 35: DW respondents' attitude towards news personalisation

Fear of missing out

We asked the respondents to what extent they agree with the following statements, on a scale ranging from 1 (I highly disagree) to 5 (I highly agree):

- I believe I would have missed something if I only read my personalized news offer in the 'my news' tab;
- I experience fear of missing important news while using this app.

Six respondents answered these questions:

- Purple label: Most respondents (three responses, 50%) somewhat agree that they would have missed something if they only read the personalised news articles in the 'my news' tab. One respondent highly agrees (16,67%). One respondent feels neutral towards the statement (16,67%), while one respondent somewhat disagrees (16,67%).
- Blue label: Two respondents somewhat disagree that they experienced fear of missing important news while using the app (33,33%) and one respondent highly disagrees (16,67%). One respondent feels neutral towards the statement (16,67%), while one respondent somewhat agrees (16,67%), and one respondent highly agrees (16,67%).

Fear of missing out

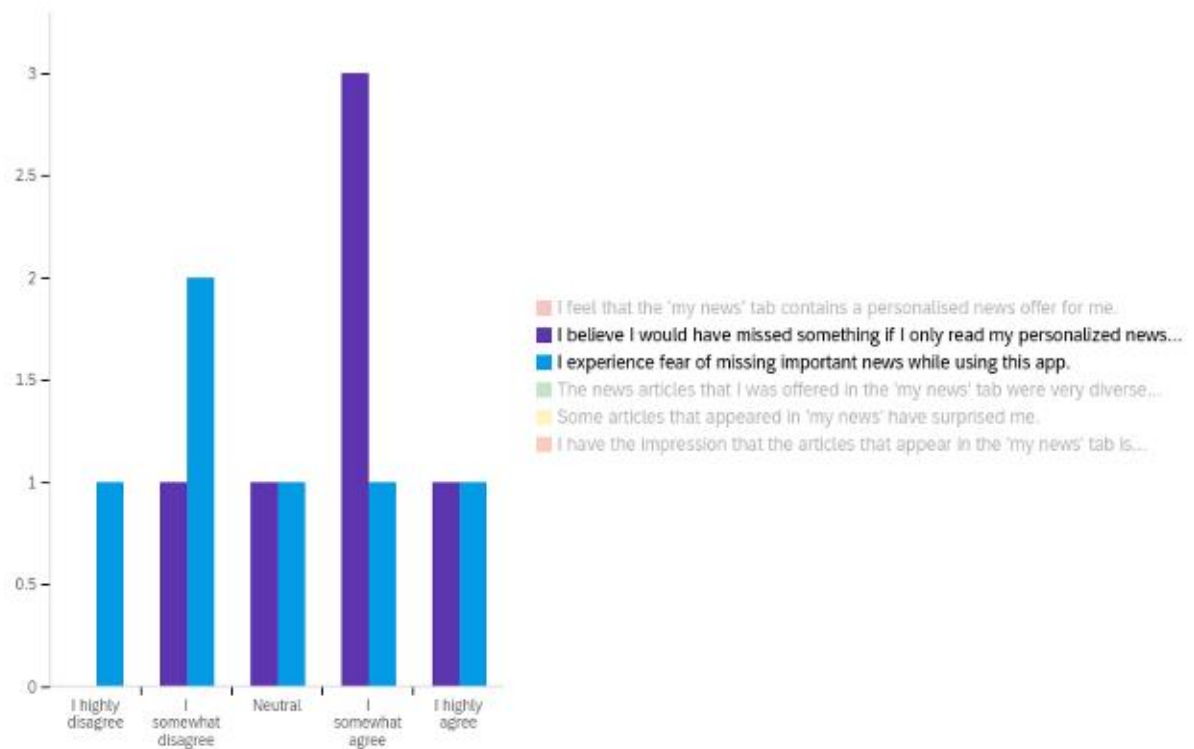


Figure 36: DW respondents' fear of missing out

Filter bubble

Most DW respondents somewhat disagree that the articles appearing in the 'my news' tab isolated them in their own cultural or ideological bubble (three of five responses, 60%), on a scale ranging from 1 'I highly disagree' to 5 'I highly agree'. One respondent feels neutral (20%) and one respondent highly agrees (20%).



Filter bubble

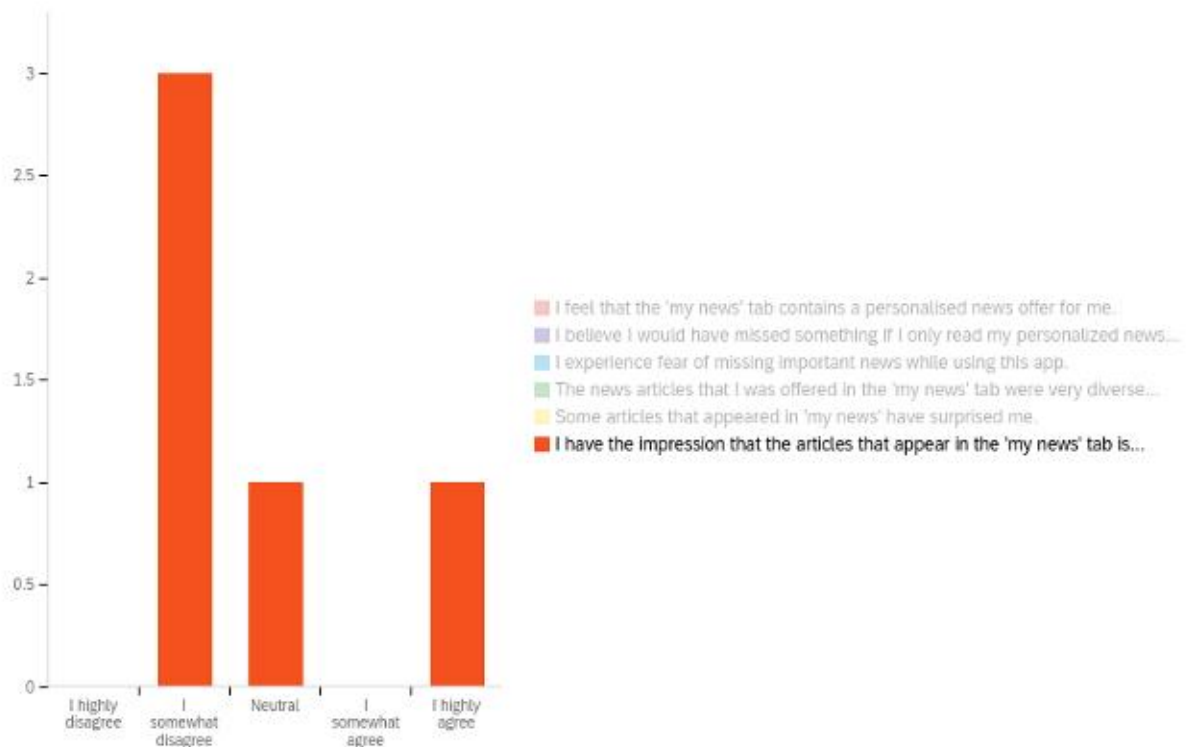


Figure 37: DW respondents' perception of filter bubble

Experience of the news offer

We inquired from the DW respondents how they experienced the personalised news offer in terms of diversity, being surprised, how often the personalised news articles surprised them, and to what extent the personalised news offer fulfilled their news expectations:

- Green label: Most respondents somewhat agree (two of six responses, 33,33%) or highly agree (two of six responses, 33,33%) that the news articles appearing in the 'my news' tab were very diverse.
- Yellow label: Most respondents feel neutral towards the statement that some articles appearing in the 'my news' tab have surprised them (three of five responses, 60%). One respondent highly agrees (20%), while one respondent somewhat disagrees (20%).
- Red label: When inquiring from the respondents how often the articles in the 'my news' tab have surprised them, 50% of respondents answered '*sometimes*' (three of six responses), two respondents say '*most of the time*' (33,33%), and one respondent answered '*about half of the time*' (16,67%).

Purple label: Most respondents indicate that the list of articles that they received in the 'my news' tab met their expectations '*most of the time*' (three of five responses, 60%). One

respondent answered, ‘about half of the time’ (20%) and one respondent said ‘sometimes’ (20%).

Experience of the news offer: diversity and subjective feeling of being surprised

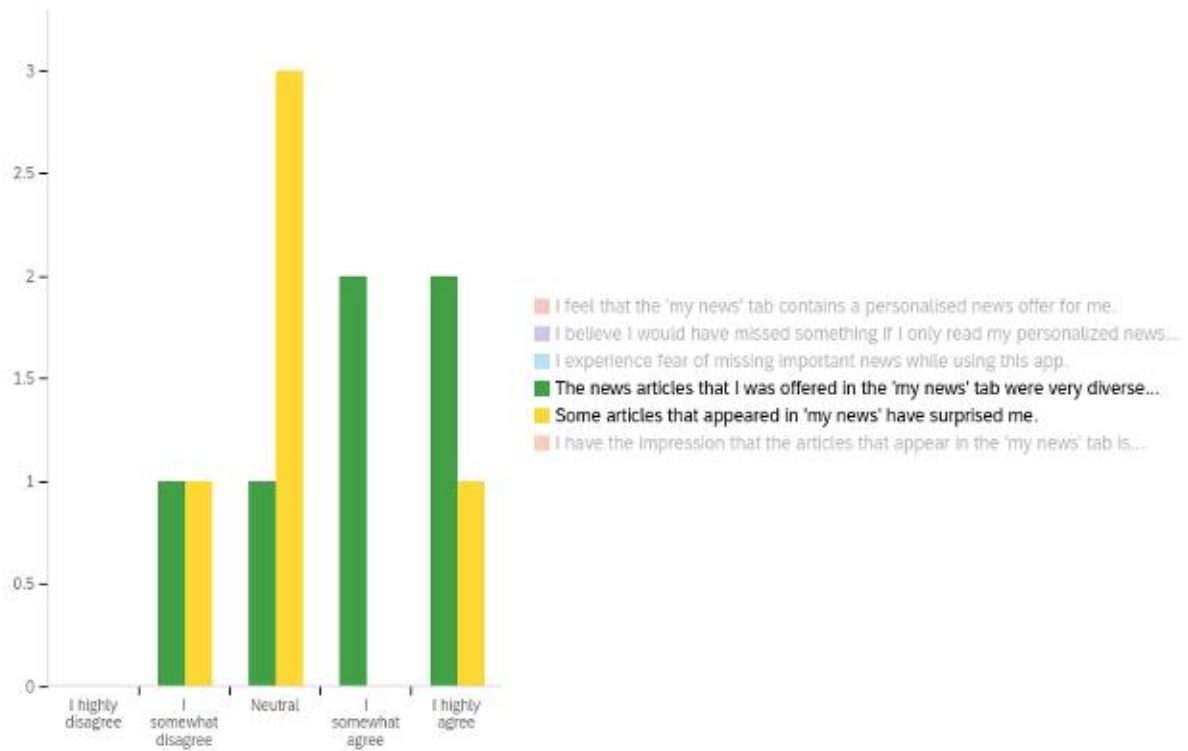


Figure 38: Diversity and subjective feeling of being surprised (DW respondents)



Experience of the news offer: subjective feeling of being surprised and the fulfilment of expectations

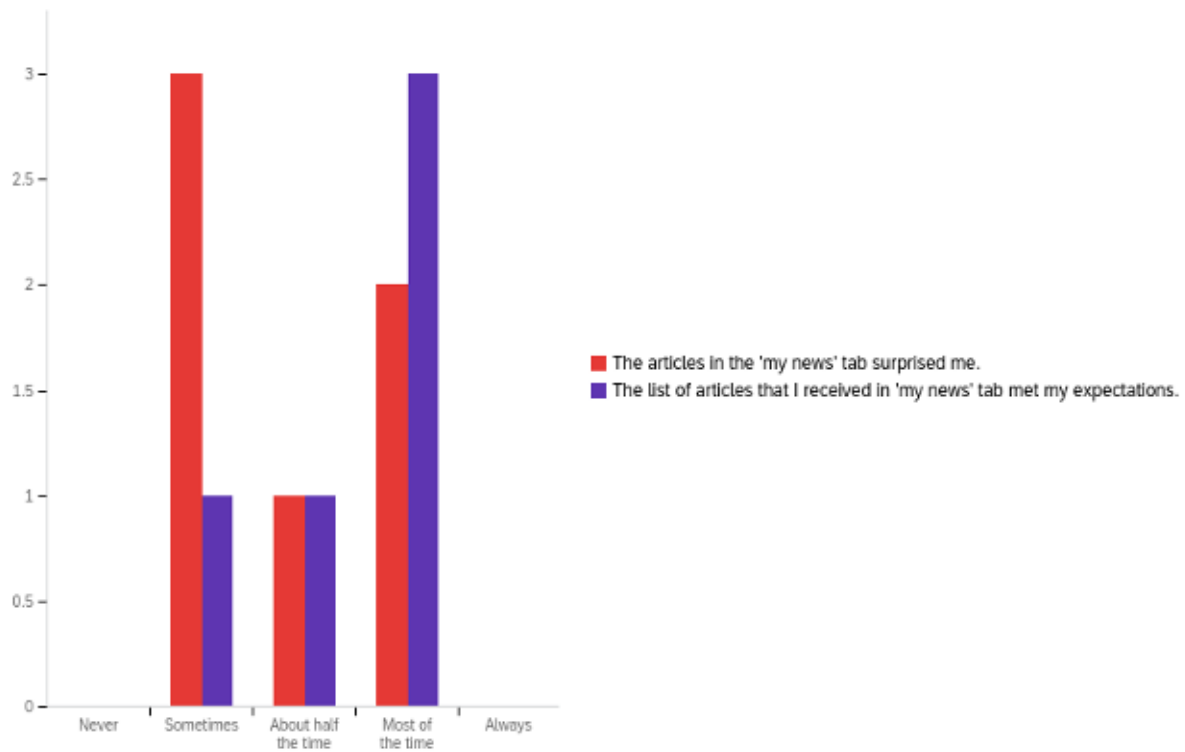


Figure 39: Subjective feeling of being surprised and the fulfilment of expectations

Experience of personalisation

We inquired from the DW respondents to what extent they experienced the articles in the ‘my news’ tab to be personalised. Two of six respondents somewhat agree that the ‘my news’ tab contained a personalised news offer for them (33,33%), while also two respondents somewhat disagree (33,33%). Two respondents feel neutral towards this statement (33,33%).



Experience of personalisation

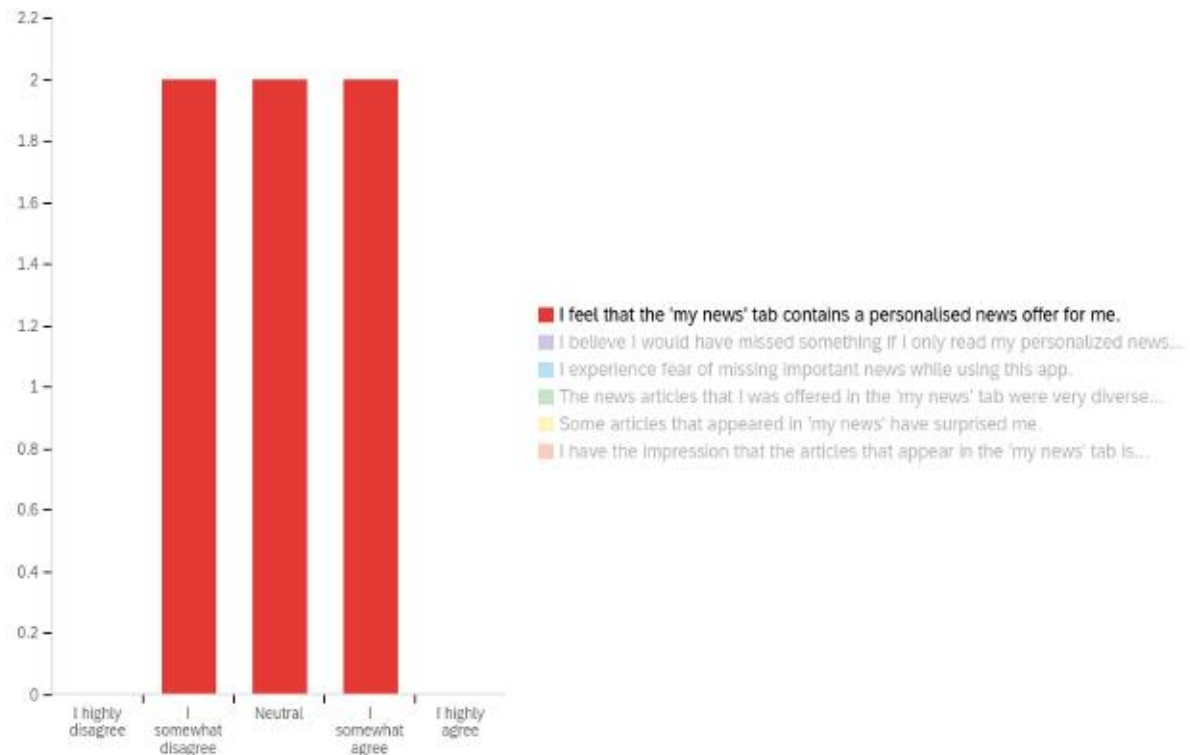


Figure 40: DW respondents' experience of personalisation

Location of app usage

Most DW respondents consulted the CPN app at home (five of six responses, 83,33%). One respondent (16,67%) answered they used the app in a place that varied depending on when they had the time.

Technical functioning

All respondents indicate that the app worked properly during the test (six responses).

Satisfaction with the app

50% of DW respondents are somewhat satisfied with the app in general (three of six responses), two respondents are neither satisfied nor dissatisfied (33,33%), and one respondent is somewhat dissatisfied (16,67%).

How satisfied are you with the app in general?

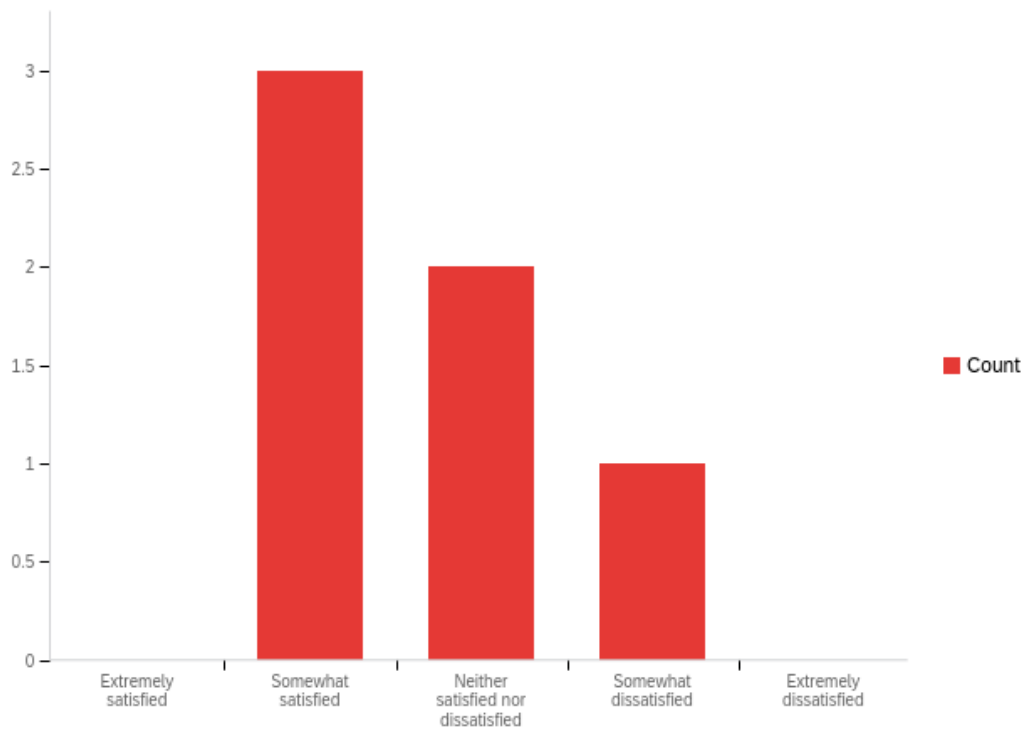


Figure 41: DW respondents' satisfaction with the app in general

Satisfaction with personalised news offer

40% of DW respondents are somewhat satisfied with the personalised list of news articles in the 'my news' tab, while 40% of DW respondents is somewhat dissatisfied (both two of five responses), on a scale ranging from 1 (extremely satisfied) to 5 (extremely dissatisfied). One respondent is neither satisfied nor dissatisfied (20%).

How satisfied are you with your personal list of news articles in the 'my news' tab?

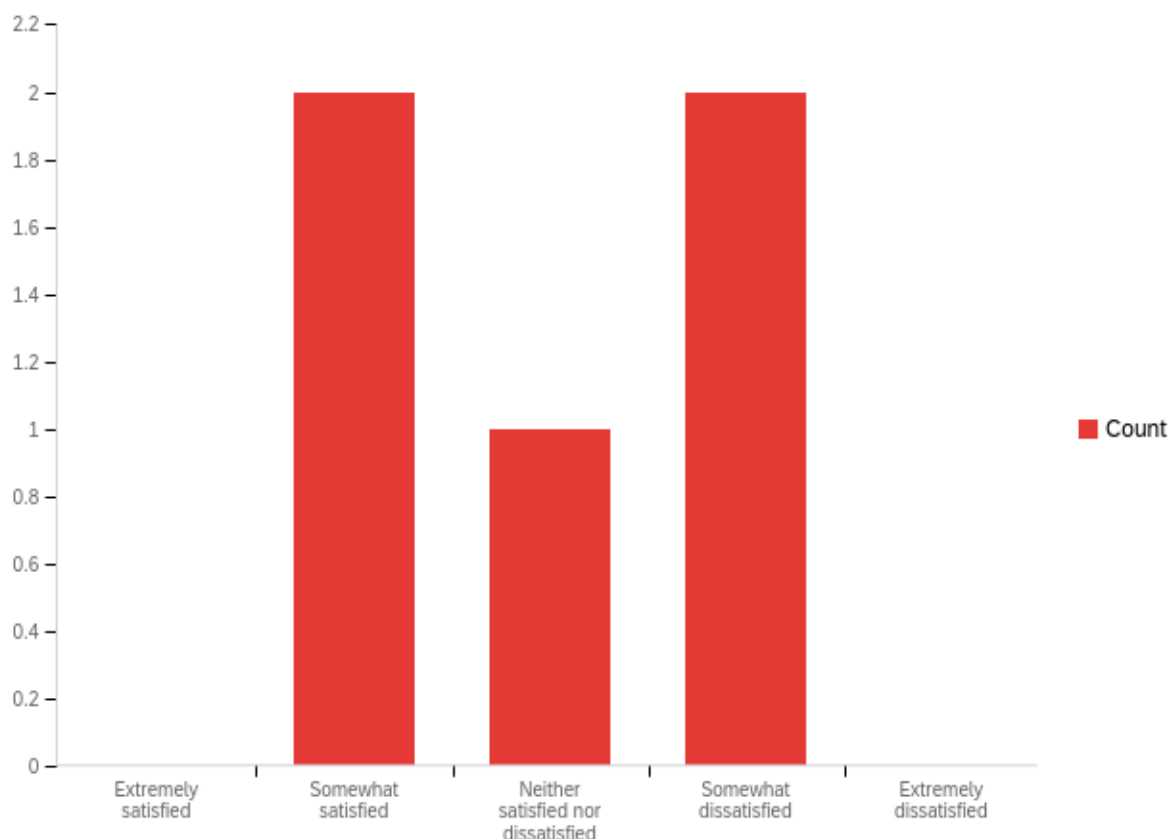


Figure 42: DW respondents' satisfaction with the personalised news offer

News consultation via other news media

An average score of 6.67/10 (6 responses), on a scale ranging from 0 (very little) to 10 (very much) indicates that the DW respondents frequently consulted news via other news media.

User-friendliness, ease of use, arrangement, and visual attractiveness of the app

We asked the DW respondents to evaluate the user-friendliness of the app, if they found everything easily, whether the app is well-arranged, and to what extent the app is visually attractive. Overall, the respondents positively evaluate the user-friendliness, ease of use, arrangement, and visual attractiveness of the app:

- Red label: Most respondents somewhat agree that the app is user-friendly (four of six responses, 66,67%), while two respondents feel neutral towards this statement (33,33%).
- Purple label: Most respondents somewhat agree that they find everything that they are looking for easily in this app (two of five responses, 40%), one respondent highly agrees (20%), while one respondent feels neutral towards this statement (20%), and one respondent somewhat disagrees (20%).



- Blue label: Most respondents somewhat agree that the app is well-arranged (four of five responses, 80%) and one respondent feels neutral towards the statement (20%).
- Green label: Most respondents somewhat agree that the app is visually attractive (three of five responses, 60%), while two respondents feel neutral towards the statement (40%).

User friendliness, ease of use, arrangement, and visual attractiveness of the CPN app:

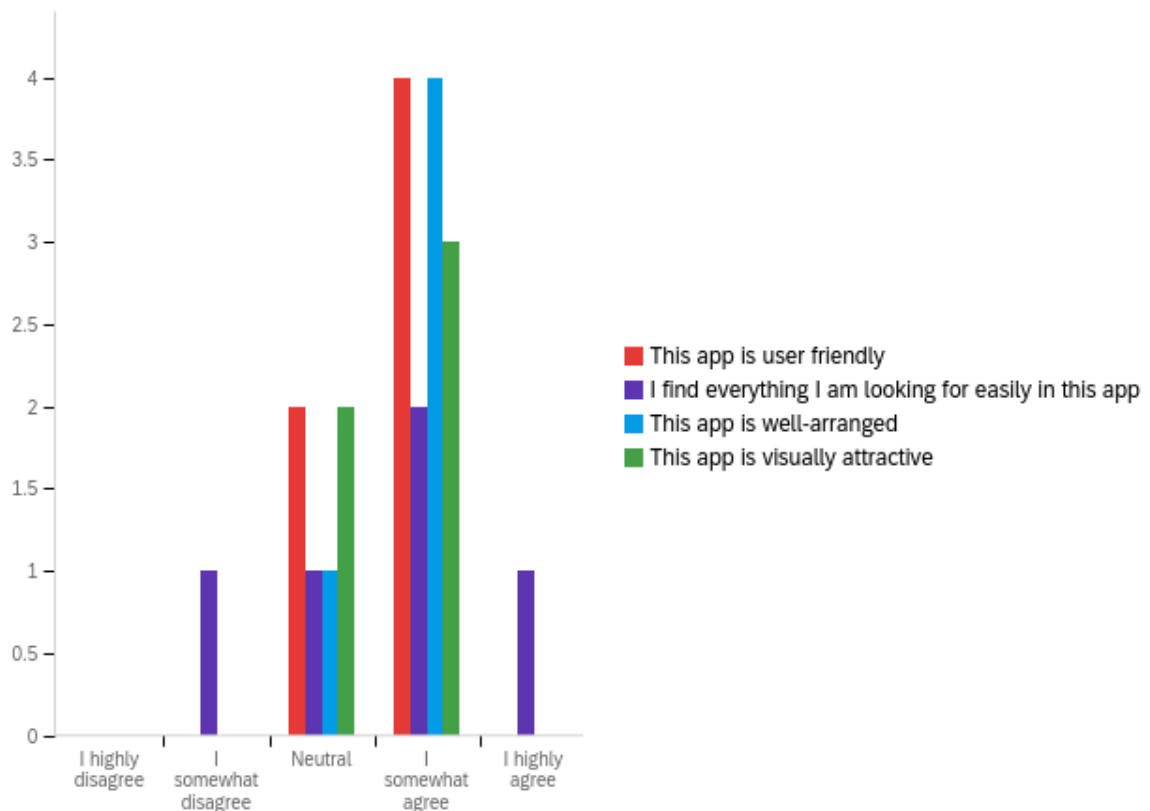


Figure 43: DW respondents' evaluation of the user-friendliness, ease of use, arrangement, and visual attractiveness of the app

Future use of the CPN app

Most DW respondents *'think'* that they would like to use the CPN app even further in the future (four of six responses, 66,67%). One respondent answered *'certainly'* (16,67%) and one respondent said *'maybe, maybe not'* (16,67%).

Would you like to use the CPN app even further in the future?

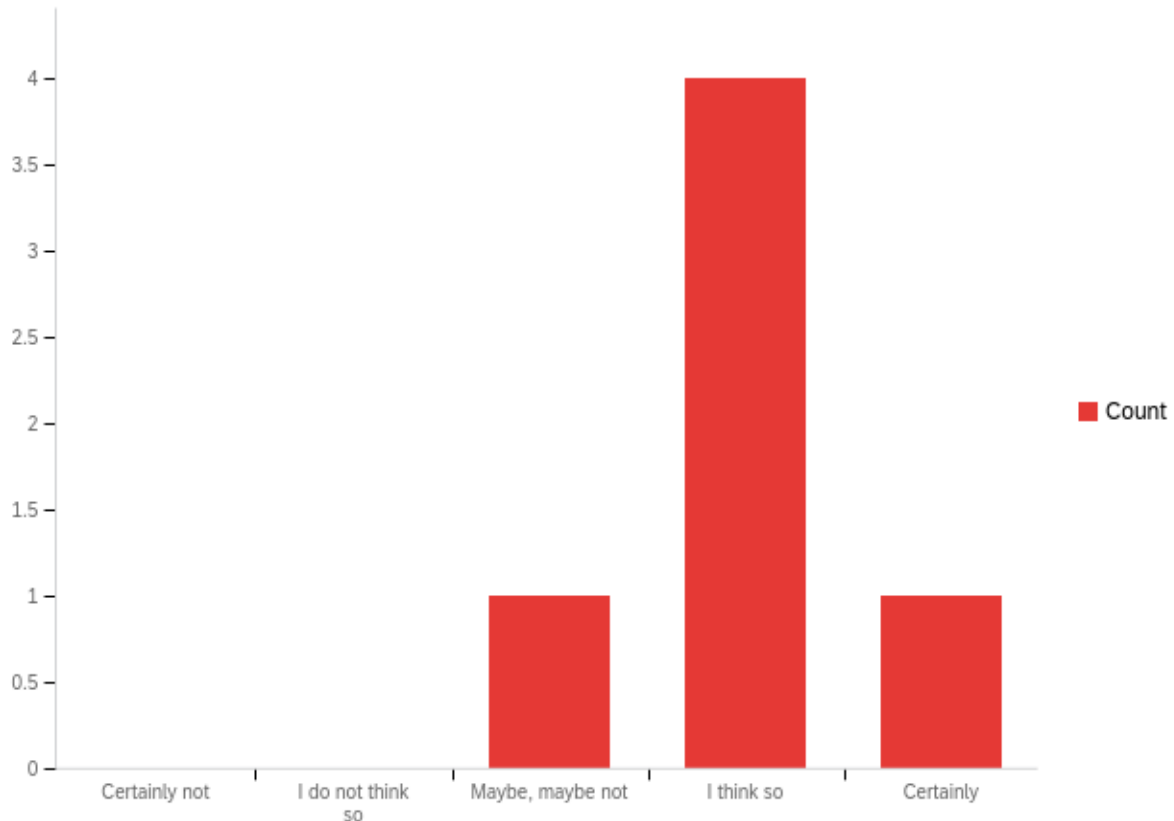


Figure 44: DW respondents' attitude towards using the CPN app in the future

Recommending the app to others

We inquired from the DW respondents to what extent they are willing to recommend the CPN-app to others:

- Most respondents are *passives* (three of five responses, 60%). Two respondents indicate their willingness to recommend the app to a colleague or friend with a score of 7/10 and one respondent assigns a score of 8/10. These respondents are satisfied with the CPN app but not happy enough to be *promoters*.
- One respondent scored their willingness to recommend the app to others 10/10 and therefore is a *promoter* (20%) This respondent is considered to be a loyal and enthusiastic user of the app.
- One respondent is a *detractor*, they scored their willingness to recommend the app to others 6/10. This respondent is considered to be an unhappy user of the app, who is unlikely to use the app again, and may even discourage others from using it.



The NPS-score is 0 (% promoters - % detractors) and therefore we conclude the DW respondents have a *medium* willingness to recommend the app to others.

How likely are you to recommend this app to a friend or colleague?

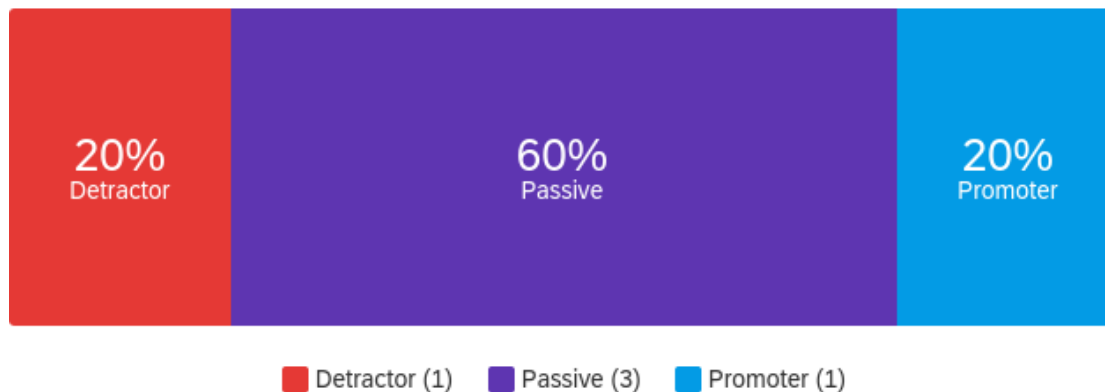


Figure 45: DW respondents' willingness to recommend the CPN app to a colleague or friend

4.3.2.4 Dropouts-survey

We recorded 27 responses (finished = true) to the dropouts-survey in Qualtrics. Most respondents (8 responses, 20%) indicated that they had 'other' reasons for not continuing to test the app i.e., "the notifications are not working", "less news content", "I was full of work", "I do not speak English", "my phone stopped working", and "I prefer to watch DW documentaries rather than watching DW news". The second most indicated reasons to stop testing the app was 'After registering, I had forgotten that I had downloaded this app' (6 responses, 15%) and 'I only use a few apps and this app is not in my daily habit of use' (6 responses, 15%). Furthermore, respondents indicated that they 'found the news offer not (sufficiently) personalized' (5 responses, 12,50%). Some respondents thought 'the app was not working well enough' (4 responses, 10%) or indicated that they were 'curious to see the app but were not going to use it often' (4 responses, 10%). A few respondents indicated that they 'realized that they don't want personalized news' (3 responses, 7,50%) or 'they already use other news sites or apps and found this app no added value' (3 responses, 7,50%). One respondent indicated 'I didn't want to spend time on it' (1 response, 2,50%).



What is (are) the main reason (s) why you did not continue testing this app? Indicating multiple answers is possible.

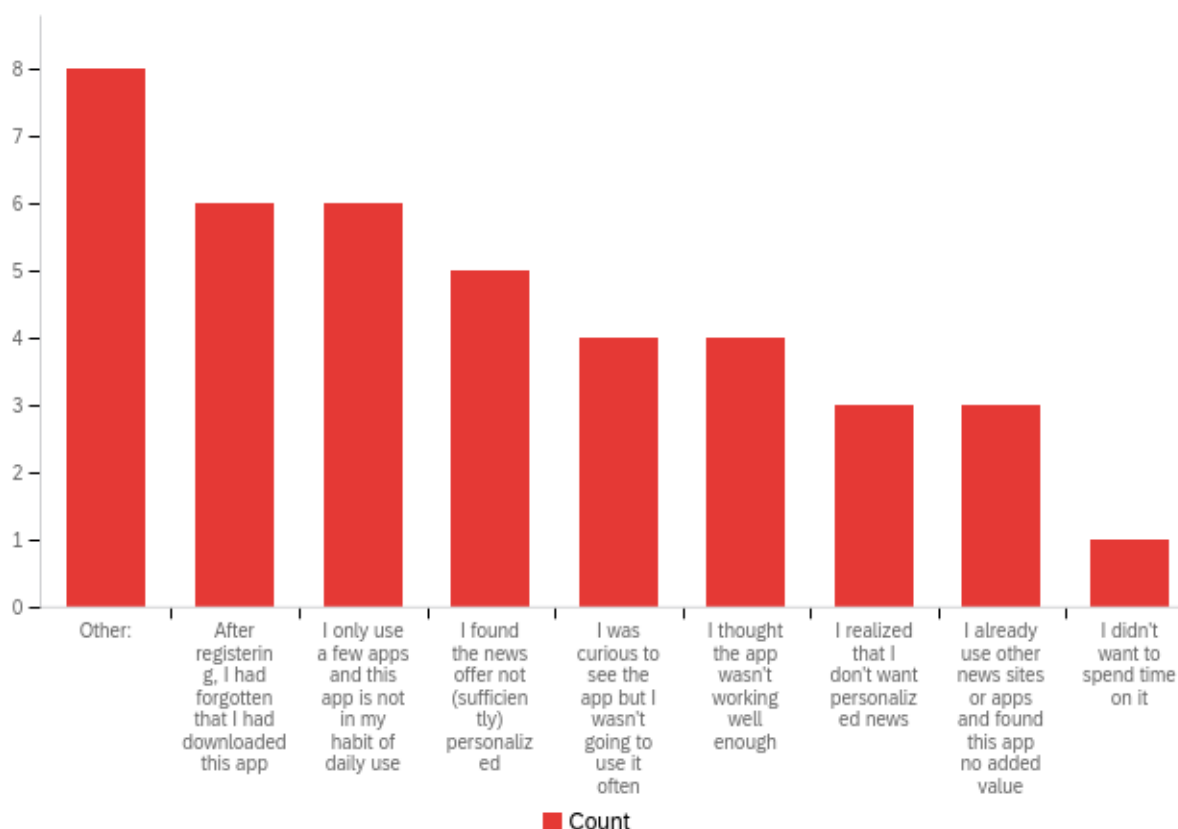


Figure 46: Main reasons of DW respondents for not continuing to test the app

4.3.2.5 DW user research conclusions

Four weekly surveys and one final survey were distributed to the DW users who registered for the third pilot testing phase of the CPN app. Overall, there was a low response to these surveys. The final response count for the DW weekly surveys was 29 responses. 21 respondents filled in the first weekly survey, three people filled in the second weekly survey, four people completed the third weekly survey, and one person finished the fourth weekly survey. Consequently, we only report on the findings of the first weekly DW survey in this deliverable because this was the only survey that allowed us to compare the results of the personalised group (ten responses) with the control group (eleven responses). In addition, we remark that we analysed and reported the survey findings in a descriptive manner because the sample size was too small to perform statistical analysis. The same goes for the results of the final DW survey. The final response count of the final survey was six responses. Again, there were too few responses to be able to compare the control group with the personalised group. Therefore, we analysed and reported the findings of the final DW survey on an overarching level, combining the responses of the personalised and the control group.

Considering the low response count to both the weekly and final surveys, we feel the need to point out that no incentives were given to the DW respondents to complete the weekly or final

surveys. We presume that if incentives were promised to the DW respondents, this could have resulted in a higher response count to the surveys.

Did the respondents feel informed after reading the ‘my news’ tab?

Overall, the results of the final survey indicated that DW respondents did not feel informed after reading the ‘my news’ tab. This result is quite different from the findings of the first weekly survey in which both the DW respondents in the personalised group and the control group answered that they subjectively felt informed. The results of the descriptive analysis of the first weekly survey also suggested that the **DW respondents in the control group felt more informed than the respondents in the personalised group**. We remark that we were not able to test the statistical significance of these findings due to the low response count of the weekly surveys.

Was the respondents’ need for news satisfied after using the app?

The results of the final survey for **DW respondents showed that their need for news was not satisfied after using the app**. Again, this result is very different from the findings of the first weekly survey in which both the DW respondents of the personalised group and the control group indicated that their need for news was satisfied after using the app. The descriptive findings of the first weekly survey also suggest that **the need for news of the DW respondents in the control group was more satisfied than the need for news of the respondents in the personalised group**. We remark that we were not able to test the statistical significance of these findings due to the low response count of the weekly surveys.

How did the respondents evaluate the individual news streams? Were they satisfied with the relevance of the articles in the individual news streams?

Considering the evaluation of the individual news streams, the findings of the final survey indicate that **DW respondents most liked the ‘main points’ news stream**, while the ‘my news’ tab was most negatively evaluated of all three individual news streams. On the other hand, the findings of the final survey show that **the relevance of the articles in the ‘my news’ tab was most positively evaluated of all the individual news streams** by DW respondents, while the relevance of the articles in the ‘recent’ tab was most negatively evaluated. This could be an indication that DW respondents perceive the personalised news articles in the ‘my news tab’ as more relevant than the non-personalised content in the ‘recent’ news stream.

To what extent did the respondents experience fear of missing out?

Investigating the DW respondents' experience of fear of missing out, the results of the final survey suggest that most DW respondents somewhat agree that they would have missed something if they only read the personalised news articles in the ‘my news’ tab. Most respondents however somewhat or highly disagree that they experienced fear of missing important news while using the app. When considering the results of the first weekly survey, both the DW respondents in the personalised group and the control group feel neutral towards these statements. It is not clear if the personalised group experienced fear of missing out more than the control group. However, the survey results suggest that **if the DW respondents only**



consume personalised news this might lead to fear of missing out, but FOMO is reduced if they also read the non-personalised articles in the ‘main points’ and ‘recent’ news tabs.

To what extent did the respondents experience a filter bubble?

The findings of the final survey show that most DW respondents somewhat disagree that the personalised articles in the ‘my news’ tab isolated them in their own cultural or ideological bubble. Yet, the findings of the first weekly survey suggest that the **DW respondents in the personalised group somewhat agree to have experienced a filter bubble after reading their personalised news offer**, whereas 50% of the respondents in the control group feel neutral towards this statement. Consequently, we conclude that this might be an indication that the consumption of a personalised news offer increases the perception of a filter bubble.

How did the respondents experience the news offer in terms of diversity, being surprised and fulfilment of their expectations?

The results of the final survey indicate that most DW respondents somewhat to highly agree that the articles that appeared in the ‘my news’ tab were very diverse. Most respondents feel neutral towards the statement that the personalised news articles have surprised them. When considering the findings of the first weekly survey, we notice that both the DW respondents in the personalised group and the control group feel neutral towards these statements.

50% of the final survey respondents state that the articles have surprised them ‘sometimes’. Most respondents indicate that the personalised news offer met their expectations ‘most of the time’. These findings are similar to the results of the first weekly survey for both the DW respondents in the personalised group and the control group.

How did respondents experience the personalised news offer? To what extent are the respondents satisfied with the personalised news offer?

Considering the results of the first weekly survey, most DW respondents in the personalised group and 50% of the respondents in the control group somewhat agree that the ‘my news’ tab contained a personalised offer for them. The first weekly survey findings furthermore suggest that most DW respondents in the personalised group were moderately satisfied with the personalised news offer. Surprisingly, most DW respondents of the control group indicated that they were slightly, moderately or extremely satisfied with the list of personalised articles in the ‘my news’ tab. When evaluating the effectiveness of the CPN-recommender, these findings at least suggest the **DW respondents in the personalised group indeed experienced the list of articles in the ‘my news’ tab as personalised**.

To what extent are the respondents satisfied with the app in general? Would respondents like to use the app again in the future? Are they willing to recommend the app to others?

The findings of the final survey show that 50% of the DW respondents are somewhat satisfied with the app. We put forward here that all the respondents indicated that the app worked properly during the test. Furthermore, the DW respondents positively evaluated the user-friendliness, ease of use, arrangement, and visual attractiveness of the app.



Correspondingly, most DW respondents think that they would like to use the CPN app even further in the future. Whereas most DW respondents are satisfied with the app, the findings of the final survey also suggest that the respondents are not happy enough to be *promoters* who would be willing to recommend the app to others.

4.3.3 DIAS

DIAS users are divided into two main groups. The first group used the CPN app for the whole duration of the pilot while the second group was populated by users that directly used personalization services by accessing DIAS websites (Web app).

The setup for the first group is the same we used for DW pilot; participants the pilot were assigned, upon registration, to two different groups:

- Control Group (CG) participants received most-popular based recommendations for the whole duration of the pilot (i.e. the articles that users are globally reading the most). The choice of this particular type of recommender (that is currently the most used across media companies) was due to the fact that it generally perform good on average but fails to capture the interest of specific groups of users (long tail effect) that, instead, is exactly the effect that we want to achieve by using our CPN recommender.
- Personalized Group users (PG) were instead receiving the regular CPN recommendations.
- Behavioural data of users are collected in the form of events such as user clicks, accessing personalized tab, reading time, etc.

4.3.3.1 Quantitative results (CPN app)

In the table below the result of the analysis of behavioural data is shown.

Table 12: Behavioural data DIAS

CG size	PG size	CG Avg number of clicks	PG Avg number of clicks	Increment of PG over CG	p-value
41	34	49.6	79.32	+59%	0.15

The table reports the difference in the click behaviour of users in the Control Group and in the Personalized Group. Users in the PG were consuming **59% more** articles than users in the CG. To be sure that this result was not influenced by chance in the assignment of users to the groups we performed strong statistical tests on the data collected that resulted in estimating the p-value in 0.15; the value is slightly higher than what is used in literature (0.05) so the results could be partially affected by chance.

In order to have more conclusive results we, therefore, performed an aggregated analyses of DIAS and DW results. The aggregation is possible because the two pilots had identical setup and were performed using the same app.



Table 13: Aggregated data for DIAS & DW

Organization	CG size	PG size	CG Avg number of clicks	PG Avg number of clicks	Increment of PG over CG	p-value
DW	99	114	17.74	26.97	+51%	0.06
DIAS	41	34	49.6	79.32	+59%	0.15
DW+DIAS	140	148	27.07	39	+41%	0.052

The result on the third row suggests that collectively DW and DIAS users were influenced by the CPN recommender to consume on average **41% more articles** than users in the Control Group. Furthermore this result is statistically robust according to the low p-value score.

4.3.3.2 Web app

a. ID-ward results

DIAS implemented the personalization feed in two websites. On *sigmalive.com* and on *city.com.cy* in order to test the behaviour of the users on a real and live digital environment.

Sigmalive.com is the market leader of digital publishing in Cyprus with more than 1.4m users and more than 20m page views every month. The main domain publishes more than 150 articles per day about current affairs, politics, society, economy, sports, health etc.

City.com.cy is a different website that operates as a subdomain and forwards the traffic to *city.sigmalive.com*. Its content is mostly feature stories, interviews, news with social impact, long articles etc.

We created a login functionality, called ID-Ward provided by Yoop, that the user could log in and reveal in the website a button on the menu called “My News” that provides the user with personalized content.

We have recorded 3.920 users on both websites with at least 1 session and 581 returning users with 2 sessions or more (Table below). From the total of 3.920 users, 240 used the “My News” button and experienced the personalized page. Respectively, from 581 returning users (2 sessions or more), 122 users tested the personalized page.



User experience results

Table 14: Usage of website from 3/2/2020 to 9/3/2020

Pilot dates 03.02.2020 - 09.03.2020				
Indicator	All Users (at least 1 session)		Returning Users (2 sessions or more)	
	(a) Website	(b) My News	(c) Website	(d) My News
Total page views	30.100	10.047	22.908	9.601
Total users (logged in)	3.920	240	581	122
Page views per user (average)	7,7	41,9	39,4	78,7
Page views per user (median)	1	2	6	3
Page views per session (average)	4,8	6,7	7,9	6,9
Total number of sessions	6.241	1.509	2.902	1.391
Sessions per user (average)	1,6	6,3	5,0	11,4
Sessions per user (median)	1	2	2	4

Explanation of Table

Columns: (a) all website users who logged in, used the website at least once and never used My News; (b) all website users that used My News at least once; (c) returning website users who never used My News; (d) returning website users that used My News

Total Pages Views: Includes views of My News page + recommended pages (clicked from the My News page) and excludes other pages

Total Users Logged In: Includes: (a) all users who have logged in; (b) all users who have logged and visited My News at least once; (c) all users who have logged in and have returned to the site at least once more; (d) all users who have logged, have returned to the site at least once more and have clicked on My News

Page Views Per Session (Average): Total number of page views/total number of sessions

Total Number of Sessions: Shows the total number of sessions by total users (average sessions = 20 minutes)

By comparing consumption of returning users, (c) and (d) with 2 sessions or more, we noticed that almost 20% of the users were using the “My News” feed. In addition, the average consumption of articles in the “My News” feed (d) was almost double from the average consumption of articles in the website (c). That indicates that users that used the personalization page consume more articles than users that did not use the personalization



page. Furthermore, in the “My News” feed users were coming back with an average of 11,4 sessions per user (d), when the website users had an average of 5,0 sessions per user (c).

Page views per user (average) indicates that the users who clicked on “My News” are more active than the average user (a), but less than the returning users (c). Moreover, the Sessions per user (median) illustrates that even excluding super-users, “My News” readers have twice as many sessions than the others.

Table 15: Time spent comparison

Time spent on all pages	Sec
Average	63,1
Median	14,0
Stdev	1321,2
Time spent on recommended pages	
Average	26,2
Median	15,3
Stdev	38,8
Time spent on the My news page only	
Average	44,7
Median	11,2
Stdev	2024,6

Comparing data recorded about how much time users spent on all pages and recommended pages, we notice that time spent on all pages, on average, is significantly higher than that on recommended pages. However, the median value on recommended pages is 1,3 seconds higher than that on all pages (Table above).



Taking into consideration the fact that users do not tend to change their online behaviour easily, we can assume, based on the above results, that with more communication activities, in the long term more users will try the page with personalized content.

User behaviour results

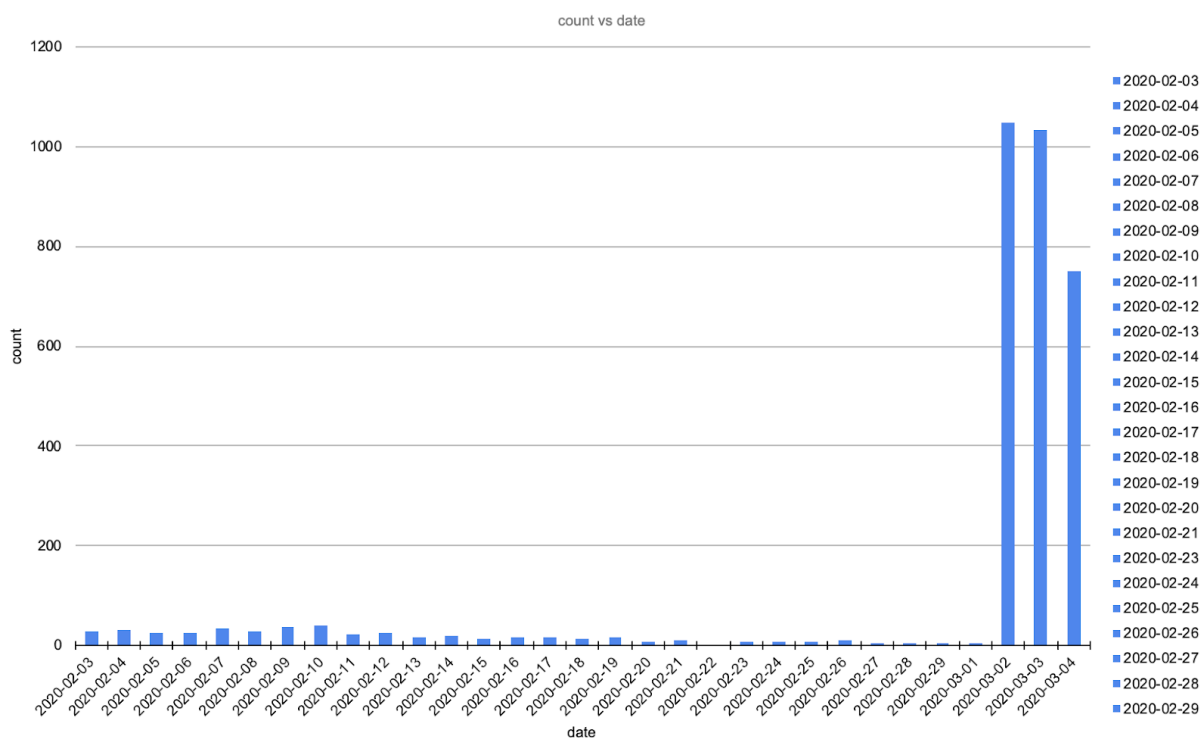


Figure 47: New users logged in from 3/2/2020 to 04/03/2020

During pilot testing we realised that users were not so willing to register in order to get personalized content. Thus, the last three days DIAS switched from a registration process, to a one click login functionality which increased significantly the usage of the service.

b. User survey results

a. Weekly surveys

We recorded 1.7k responses in Qualtrics of which we consider **1036 responses** (finished = true) as the final response count for the DIAS (website) weekly surveys. We recorded 334 respondents to the first weekly survey (10-16 February), 275 responses to the second weekly survey (17-23 February), 228 responses to the third weekly survey (24 February – 1 March), and 199 responses to the fourth weekly survey (2-8 March). All respondents who logged into the DIAS website were allocated to the **personalised group**.

The table below shows the **sociodemographic data** of the survey respondents of the weekly DIAS website-application surveys.

Table 16: Sociodemographic data of the DIAS website-application weekly survey respondents

Total response count	Gender	Age	Education
1036	Male: 727 Female: 288 X: 21	Mean age: 54 Minium: 20 Maximum: 120	Master’s degree: 245 Higher education degree: 287 Higher secondary education degree: 312 Lower secondary education degree: 50 High school degree: 47 University/college students: 95

Subjective feeling of being informed

The average score of the respondents’ subjective feeling of being informed after reading ‘my news’ on the DIAS website increased each week of the third CPN pilot (personalised group), on a scale ranging from 0 (not informed) to 10 (very informed) (Figure below). The average score for the feeling of being informed was 6,61/10 (334 responses) after the first weekly survey (10-16 February), 6,81/10 (275 responses) after the second weekly survey (17-23 February), 6,94/10 after the third weekly survey (24 February – 1 March), and 7,13/10 (199 responses) after the fourth weekly survey (2-9 March).

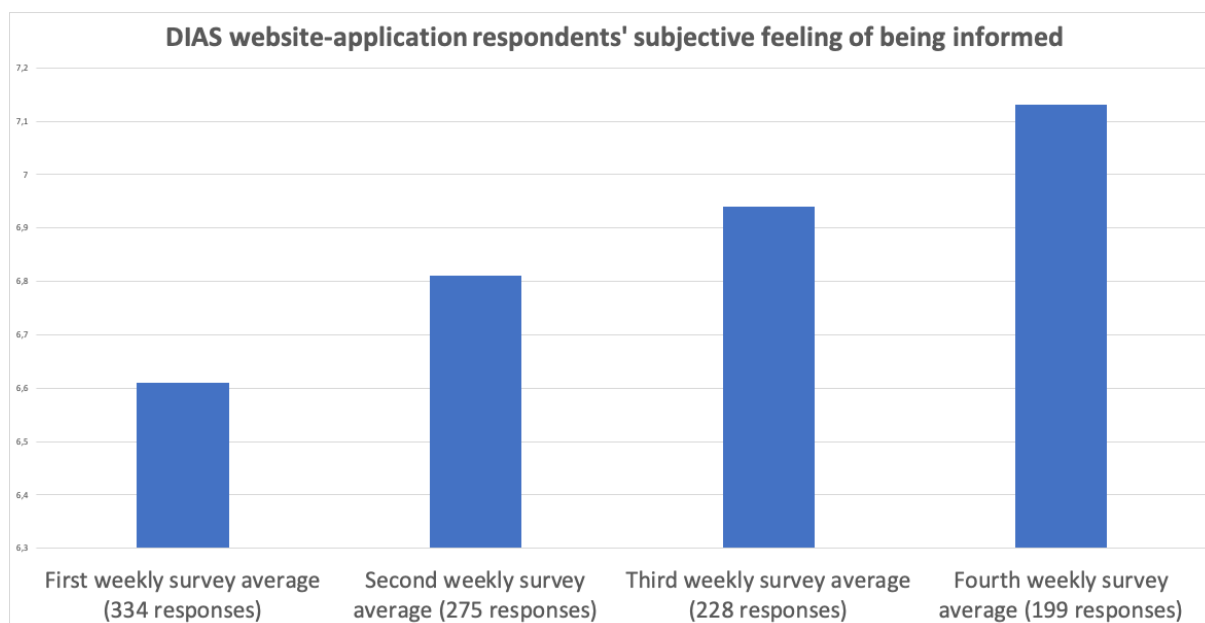


Figure 48: DIAS (website) respondents subjective feeling of being informed during the weekly surveys

Satisfaction of the need for news

The average score of the DIAS (website) respondents’ satisfaction of the need for news after reading ‘my news’ increased each week of the third CPN pilot (personalised group), on a scale ranging from 0 (not informed) to 10 (very informed). The average score of the satisfaction for the need for news after reading ‘my news’ on the DIAs website was 6,61/10 (334 responses) after the first weekly survey (10-16 February), 6,81/10 (275 responses) after the second weekly survey (17-23 February), 7,14/10 (228 responses) after the

third weekly survey (17-23 February), and 7,22/10 (199 responses) after the fourth weekly survey (2-9 March).

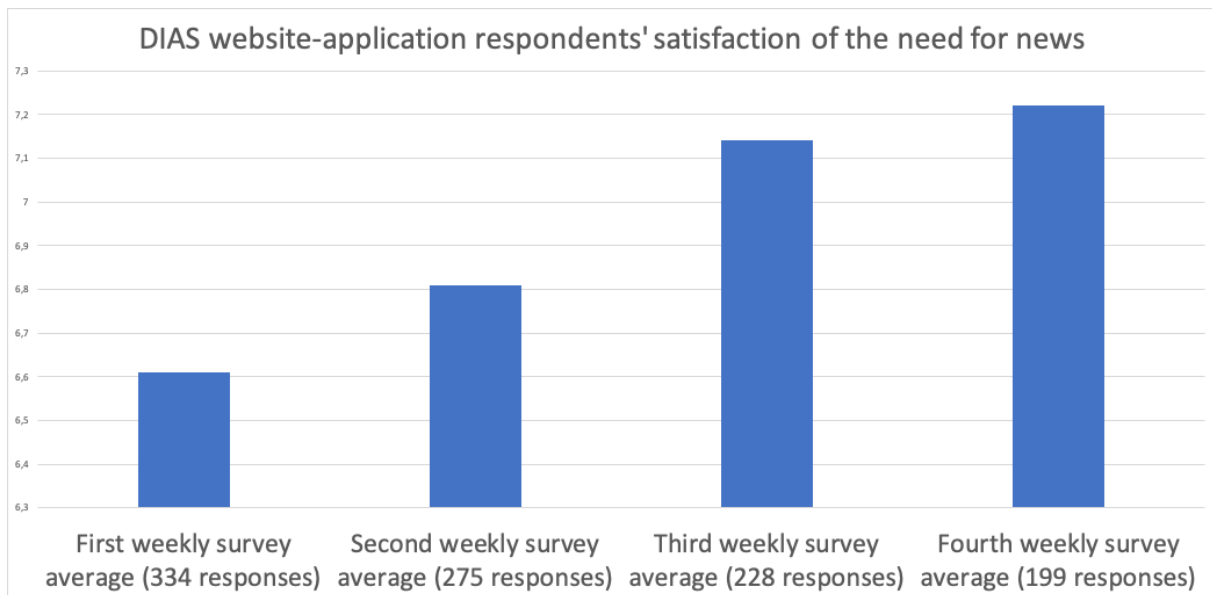


Figure 49: DIAS (website) respondents' satisfaction of the need for news after reading 'my news' (personalised group)

Fear of missing out

We inquired from the DIAS website-application respondents (personalised group) to what extent they experienced fear of missing out (Figure):

- Purple label: Most respondents somewhat agree that they would have missed something if they only read the personalised news offer in the 'my news' tab on the DIAS website (360 of 959 responses, 37,54%) and 89 respondents highly agree (8,98%). 314 respondents feel neutral towards this statement (32,74%), while 136 respondents somewhat disagree (14,18%), and 60 respondents highly disagree (6,26%).
- Blue label: Most respondents somewhat disagree that they experienced fear of missing important news while using the 'my news' service on the DIAS website (317 of 940 responses, 33,72%). 111 respondents highly disagree (11,81%). 308 respondents feel neutral towards the statement (32,77%), while 161 respondents agree (17,13%), and 43 respondents highly agree (4,57%).



Fear of missing out

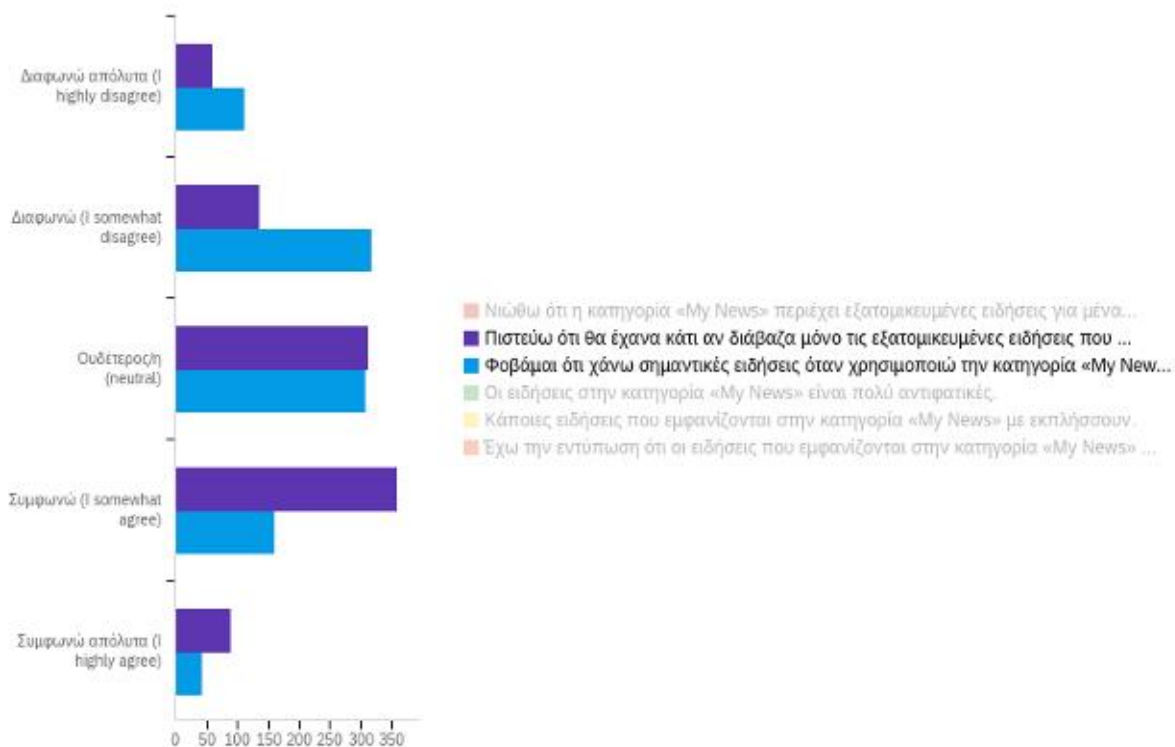


Figure 50: DIAS (website) respondents' fear of missing out

Filter bubble

Considering the combined results of the four weekly surveys, most respondents (personalised group) somewhat disagree that the articles appearing in the 'my news' service on the DIAS website isolate them in their own cultural or ideological bubble (369 of 909 responses, 40,59%). 108 respondents highly disagree (11,88%). 310 respondents feel neutral towards the statement (34,10%), while 86 respondents somewhat agree (9,46%) and 36 respondents highly agree (3,96%).

Filter bubble

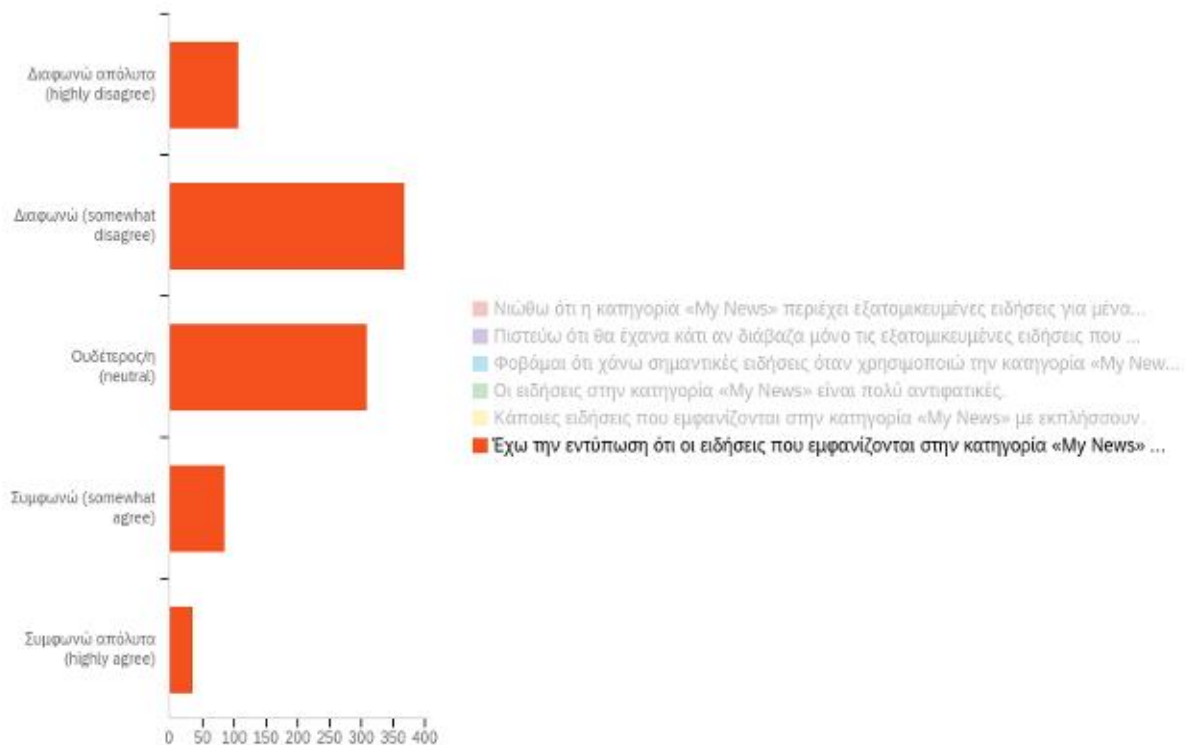


Figure 51: DIAS (website) respondents' perception of filter bubble

Experience of the news offer

We inquired from the DIAS website-application respondents (personalised group) to what extent they experienced the news offer in terms of diversity, being surprised, how often the personalised news offer surprised them and to what extent the personalised news articles fulfilled their news expectations (combined results of the four weekly surveys):

- Green label: Most respondents somewhat disagree that the articles offered in the 'my news' service on the DIAS website were very diverse (370 of 916 responses, 40,44%). 106 respondents highly disagree (11,58%). 338 respondents feel neutral towards the statement (36,94%), while 75 respondents somewhat agree (8,20%) and 26 respondents highly agree (2,84%).
- Yellow label: Most respondents feel neutral towards the statement that the articles appearing in the 'my news' service have surprised them (396 of 916 responses, 43,23%). 173 respondents somewhat disagree (18,89%) and 52 respondents highly disagree (5,68%). On the other hand, 254 respondents somewhat agree (27,73%) and 41 respondents highly agree (4,48%).
- Red label: When asked how often the articles appearing in the 'my news' service on the DIAS website surprised them, most respondents indicate 'sometimes' (521 of 933 responses, 55,84%). 151 respondents were 'never' surprised (16,18%), 141

respondents ‘about half of the time’ (15,11%), 87 respondents ‘most of the time’ (9,32%), and 33 respondents ‘always’ (3,54%).

- Purple label: Most respondents indicate that the list of articles in the ‘my news’ service has met their expectations ‘most of the time’ (321 of 910 responses, 35,27%). The list of articles in ‘my news’ met the expectations of 64 respondents ‘always’ (7,03%), ‘about half of the time’ for 188 respondents (20,66%), ‘sometimes’ for 276 respondents (30,33%), and ‘never’ for 61 respondents (6,7%).

Experience of the news offer: diversity and subjective feeling of being surprised



Figure 52: DIAS (website) respondents’ evaluation of the diversity of the news offer and the subjective feeling of being surprised (combined result of the four weekly surveys)

Experience of the news offer: subjective feeling of being surprised and the fulfilment of expectations

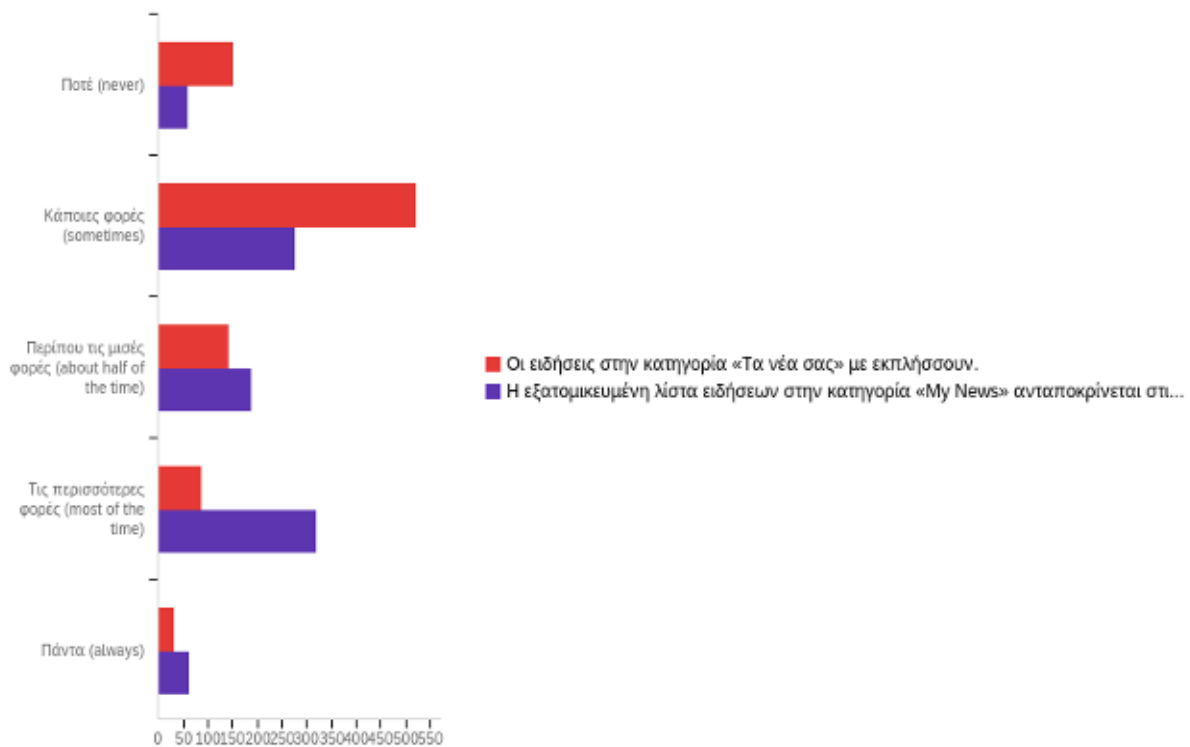


Figure 53: DIAS (website) respondents’ evaluation of the subjective feeling of being surprised and the fulfilment of expectations

Experience of personalisation

Most respondents (personalised group) somewhat agree that the ‘my news’ service on the DIAS website contains a personalised news offer for them (401 of 991 responses, 40,46%). 89 respondents highly agree (8,98%). 376 respondents feel neutral towards the statement (37,94%), while 68 respondents somewhat disagree (6,86%), and 57 respondents highly disagree (5,75%). The combined results of the four weekly surveys in regard to the DIAS website-application respondents’ experience of personalisation is visualised in the figure below.

Experience of personalisation

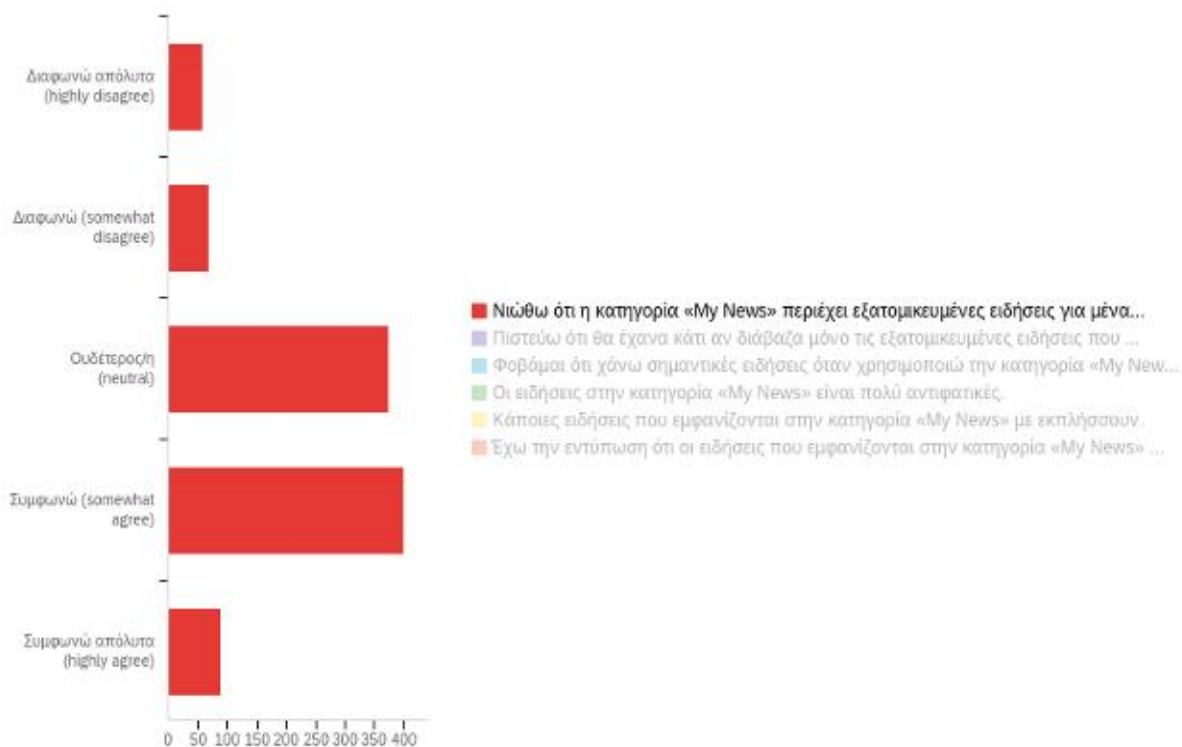


Figure 54: DIAS website-application respondents' experience of personalisation (combined result of the four weekly surveys)

Satisfaction with personalised news offer

Considering the combined results of the four weekly surveys, most respondents of the personalised group are neither satisfied nor dissatisfied with the personalised news offer in the 'my news' service on the DIAS website (365 of 942 responses, 38,75%). 24 respondents are slightly dissatisfied (2,55%). 194 respondents are slightly satisfied (20,59%), 306 respondents are moderately satisfied (32,48%), and 53 respondents are extremely dissatisfied (5,63%).



Satisfaction with the personalised news offer

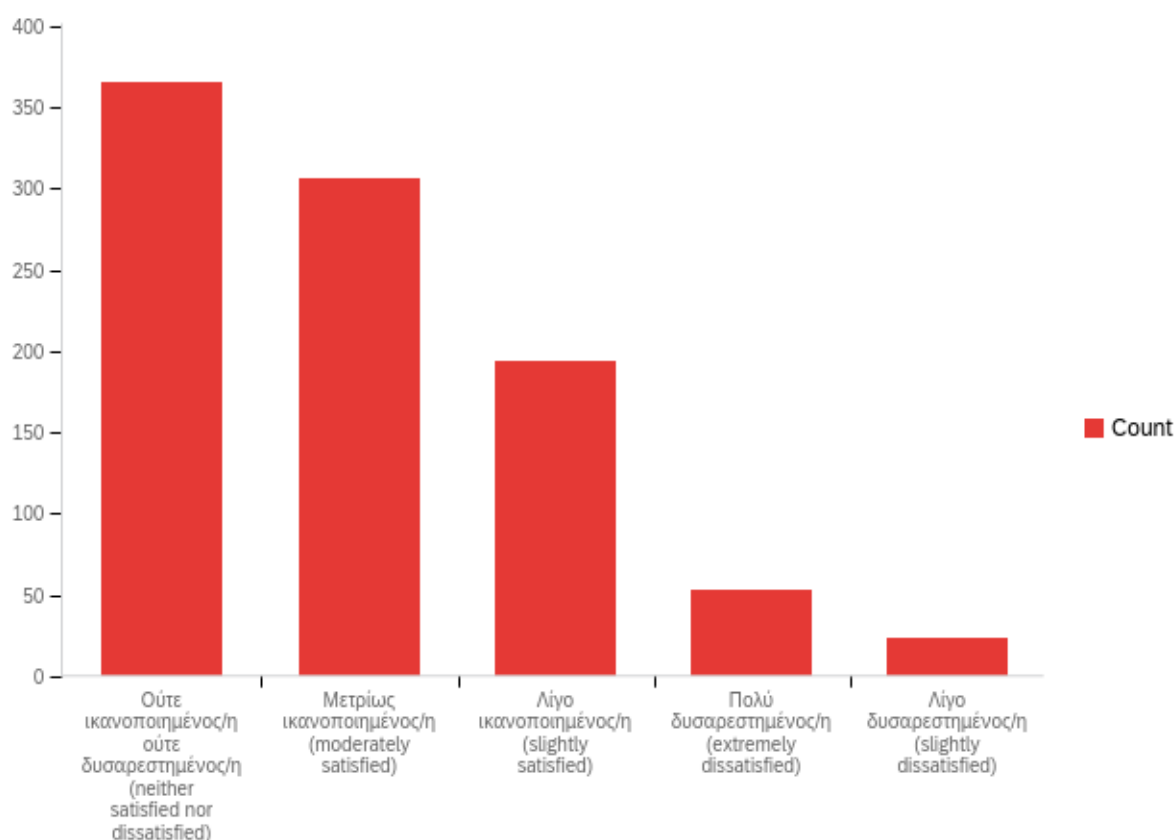


Figure 55: DIAS (website) respondents' satisfaction with the personalised news offer (combined results of the four weekly surveys)

News consultation via other news media

An average score of 7,02/10 (965 responses) indicates that the DIAS website-application respondents frequently consulted news via other news media (combined result of the four weekly surveys).

b. Final survey

We recorded 3.4k responses in Qualtrics. 3196 responses (finished = false) were excluded from data-analysis. Correspondingly, we consider **227 responses** (finished = true) as the final response count for the DIAS (website) final survey. All respondents who logged into the DIAS website were allocated to the **personalised group**.

Evaluation of the personal data receipt

200 DIAS website-application respondents evaluated the personal data receipt in terms of perceived transparency:

- 68 respondents do not perceive the PDR as a transparent approach towards data collection and processing (34%). These respondents are **detractors** and scored the PDR on average 4,43/10.
- 68 of 200 respondents scored the PDR on average 7,57/10 and are considered to be **passives** (34%). These respondents are satisfied with the PDR but are not happy enough to be promoters.
- 64 of 200 respondents (32%) scored the PDR on average 9,73/10 and are considered to be **promoters** who are enthusiastic about the personal data receipt.

The NPS-score is -2 (% promoters - % detractors) and we conclude that overall, the DIAS website respondents assign a *low* ranking to the perceived transparency of the personal data receipt.

To what extent did you perceive the personal data receipt as a transparent approach towards data collection and processing?

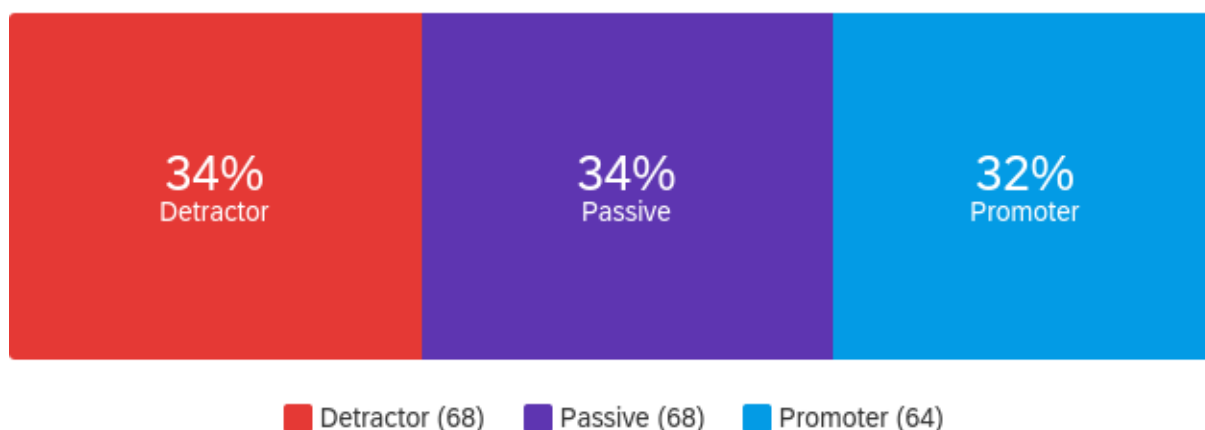


Figure 56: DIAS website-application respondents' evaluation of the personal data receipt

Satisfaction of the need for news

The DIAS website-application respondents indicate that their need for news is satisfied after reading the articles in the 'my news' stream with an average score of 7,85/10 (216 responses).

Subjective feeling of being informed

The DIAS website-application respondents indicate that they feel informed after reading the 'my news' stream with an average score 7,97/10 (220 responses).

Satisfaction with the 'my news' service in general

224 respondents indicated to what extent they are satisfied with the 'my news' service in general. Most DIAS website respondents are extremely satisfied with the 'my news' service in general (140 of 224 respondents, 62,5%). 34 respondents are somewhat satisfied (15,18%), 44 respondents feel neutral (19,64%), while two respondents are somewhat dissatisfied (0,89%), and four respondents are extremely dissatisfied (1,79%).

How satisfied are you with the 'My news' service in general?

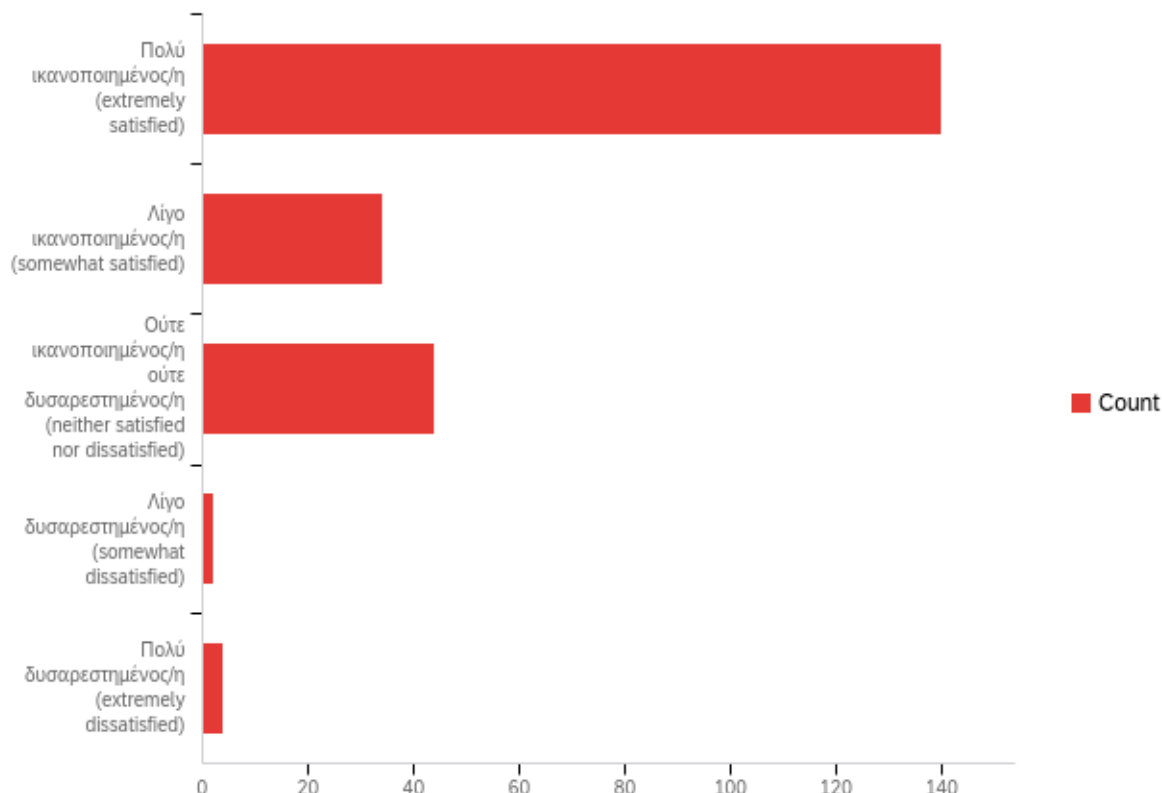


Figure 57: DIAS website-application respondents' satisfaction with the 'my news' service in general

Satisfaction with personalised news offer

Most DIAS website-application respondents are extremely satisfied with the list of personalised news articles in the 'my news' service (137 of 223 responses, 61,43%). 39 respondents are somewhat satisfied (17,49%), 41 respondents feel neutral (18,39%), two respondents are somewhat dissatisfied (0,90%), and four respondents are extremely dissatisfied (1,79%).

How satisfied are you with the personalised news articles in the 'My News' service?

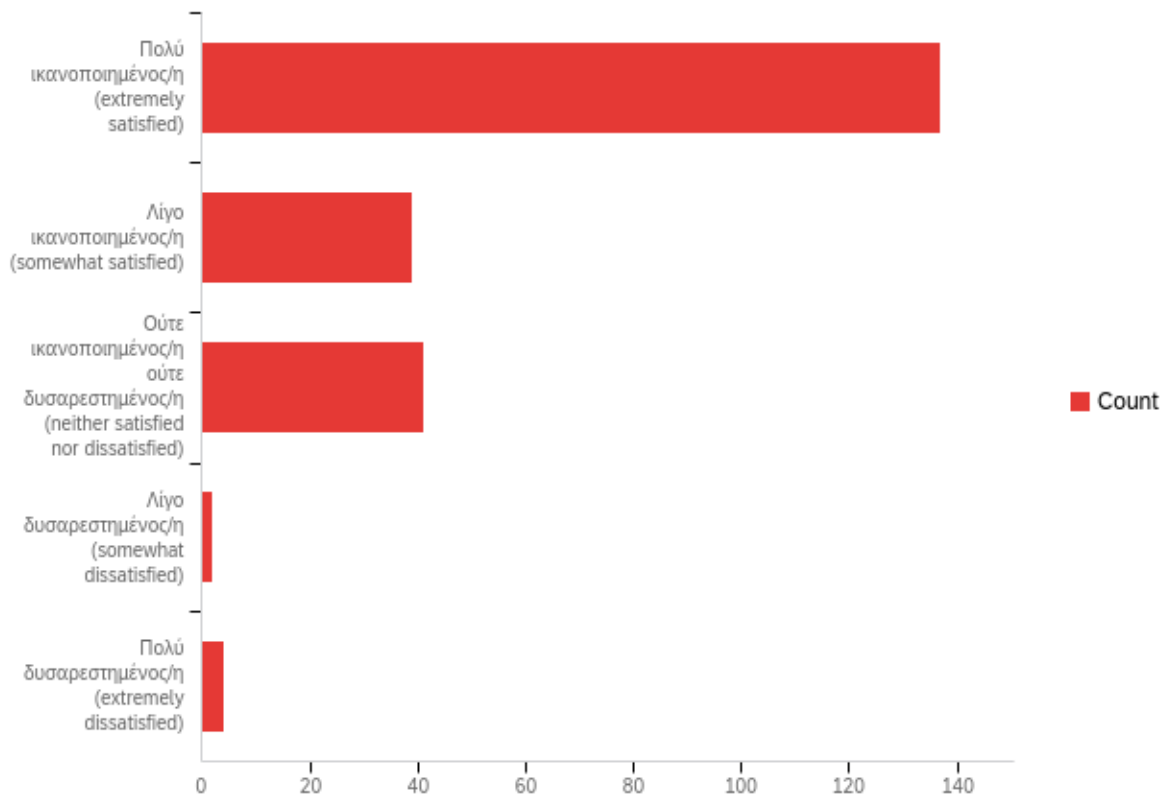


Figure 58: DIAS website-application respondents' satisfaction with the personalised news articles in the 'my news' service

Attitude towards news personalisation

224 DIAS website-application respondents (personalised group) indicated their attitude towards news personalisation in general:

- 74 respondents perceive news personalisation as useful (33,04%). These respondents are **promoters**, they are enthusiastic about news personalisation and assign an average score of 9,58/10.
- 92 respondents are **passives** (41,07%). These respondents scored news personalisation on average 7,66/10.
- 58 respondents think news personalisation is unnecessary (25,89%) and assign it an average score of 4,9/10. These respondents are **detractors** who are unhappy about news personalisation, they are unlikely to use it again, and may discourage others from trying it.

The NPS-score is 7,14 and we conclude that overall, DIAS website respondents assign a *medium* ranking to news personalisation.



Indicate (rank) to what extent that you think news personalization is unnecessary vs. very useful?

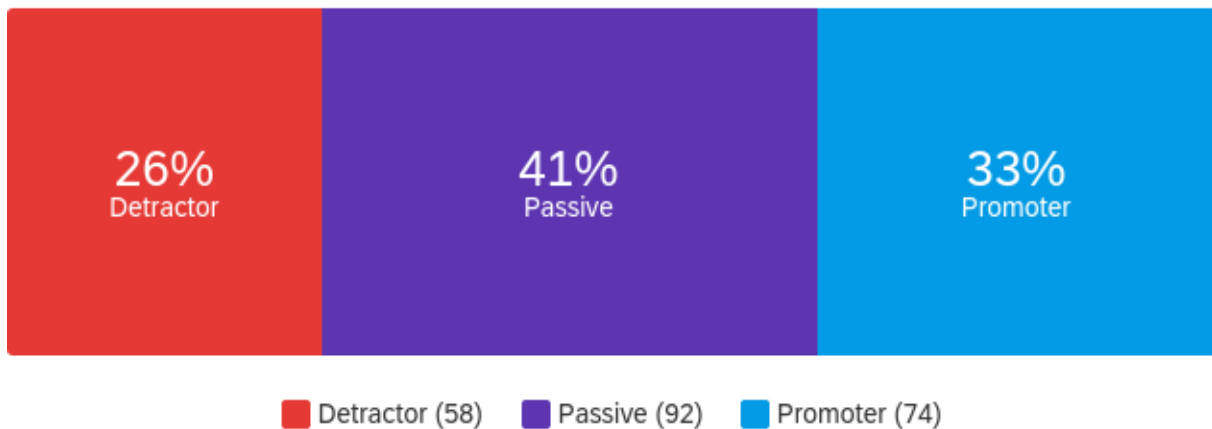


Figure 59: DIAS website-application respondents' attitude towards news personalisation

Fear of missing out

We inquired from the DIAS website-application respondents (personalised group) to what extent they agree with the following statements, on a scale ranging from 1 (I highly disagree) to 5 (I highly agree):

- I believe I would have missed something if I only read my personalized news offer in the 'my news' service;
- I experience fear of missing important news while using the 'my news' service.

Considering the DIAS website-application respondents' experience of FOMO:

- Purple label: Most respondents somewhat agree that they would have missed something if they only read the personalised news offer in the 'my news' tab (75 of 210 responses, 35,71%). 26 respondents highly agree (12,38%), while 67 respondents feel neutral towards the statement (31,90%), 27 respondents somewhat agree (12,86%), and 15 respondents highly disagree (7,14%).
- Blue label: Most respondents somewhat disagree that they experienced fear of missing important news while using the 'my news' service (81 of 212 responses, 38,21%). 41 respondents highly disagree (19,34%), while 54 respondents feel neutral towards the statement (25,47%), 28 respondents somewhat agree (13,21%), and eight respondents highly agree (3,77%).



Fear of missing out

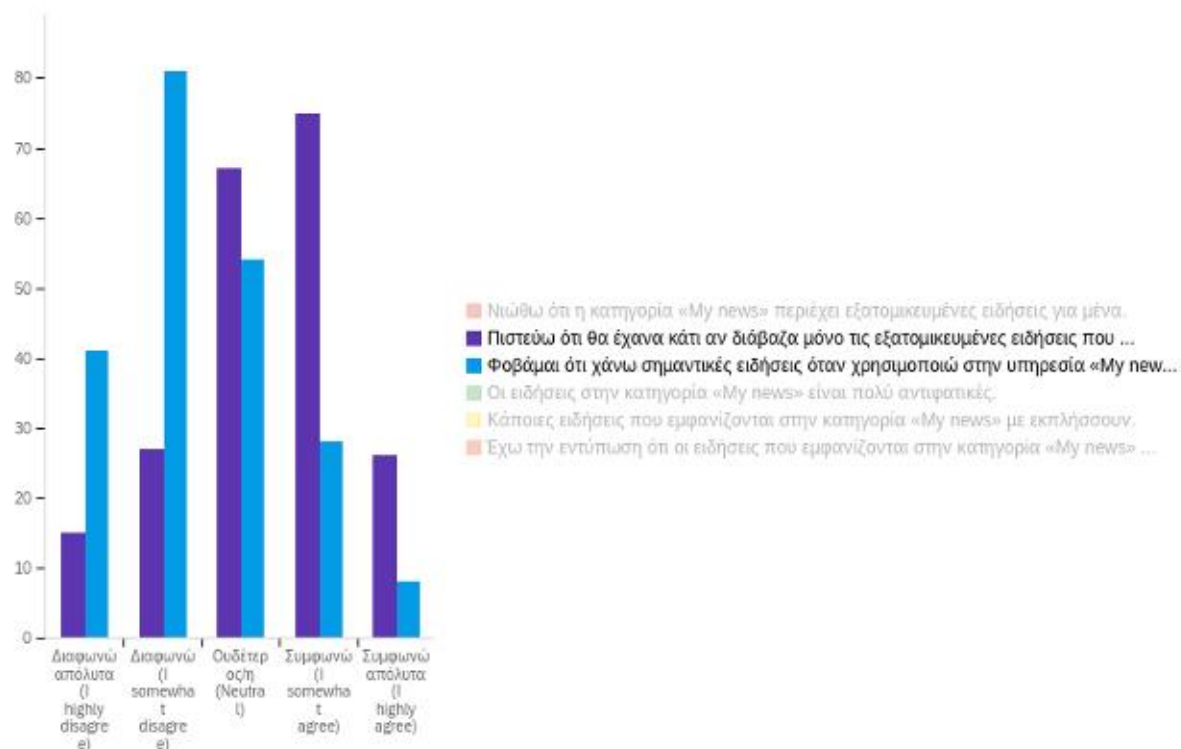


Figure 60: DIAS website-application respondents' fear of missing out

Filter bubble

We asked the DIAS website-application respondents (personalised group) to what extent they felt that the personalised news offer isolated them in a filter bubble. Most respondents somewhat disagree that the articles that appeared in the ‘my news’ tab isolate them in their own cultural or ideological bubble (77 of 209 responses, 36,84%). 39 respondents highly disagree (18,66%), while 70 respondents feel neutral towards the statement (33,49%), 18 respondents somewhat agree (8,61%), and five respondents highly agree (2,39%).

Filter bubble

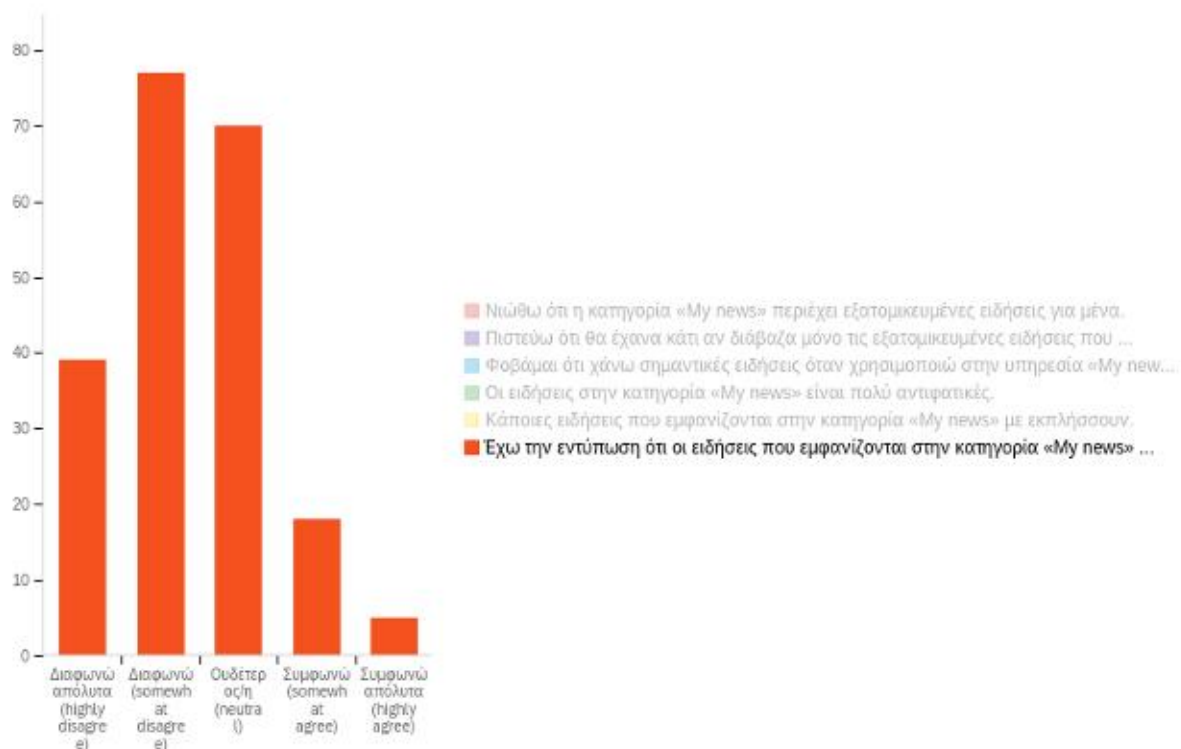


Figure 61: DIAS (website) respondents' experience of filter bubble

Experience of the news offer

We inquired from the DIAS website-application respondents (personalised group) how they experienced the news offer in terms of diversity, being surprised, how often the personalised news articles surprised them, and to what extent the personalised news offer met their news expectations.

- Green label: Most respondents somewhat disagree that the news articles appearing in the 'my news' service were very diverse (86 of 205 responses, 41,95%). 39 respondents highly disagree (19,02%), while 66 respondents feel neutral towards the statement (32,20%), 11 respondents somewhat agree (5,37%), and three respondents highly agree (6,16%).
- Yellow label: Most respondents feel neutral towards the statement that the articles that appeared in the 'my news' tab have surprised them (85 of 211 responses, 40,28%). 64 respondents somewhat agree (30,33%), 13 respondents highly agree (6,16%), while 39 respondents somewhat disagree (18,48%), and ten respondents highly disagree (4,74%).
- Red label: When inquiring from the respondents how often the articles that appeared in the 'my news' service have surprised them, most respondents answered 'sometimes' (136 of 221 responses, 61,54%). 29 respondents said 'never' (13,21%),



42 respondents said ‘about half of the time’ (10,86%), 22 respondents answered ‘most of the time’ (9,95%), and ten respondents indicated ‘always’ (4,52%).

- Purple label: Most respondents indicated that the articles in the ‘my news’ service met their expectations ‘most of the time’ (84 of 220 responses, 38,18%). 26 respondents answered ‘always’ (11,82%), 42 respondents said ‘about half of the time’ (19,09%), 64 indicated the articles surprised them ‘sometimes’, and four respondents answered ‘never’ (1,82%).

Experience of the news offer: diversity and subjective feeling of being surprised

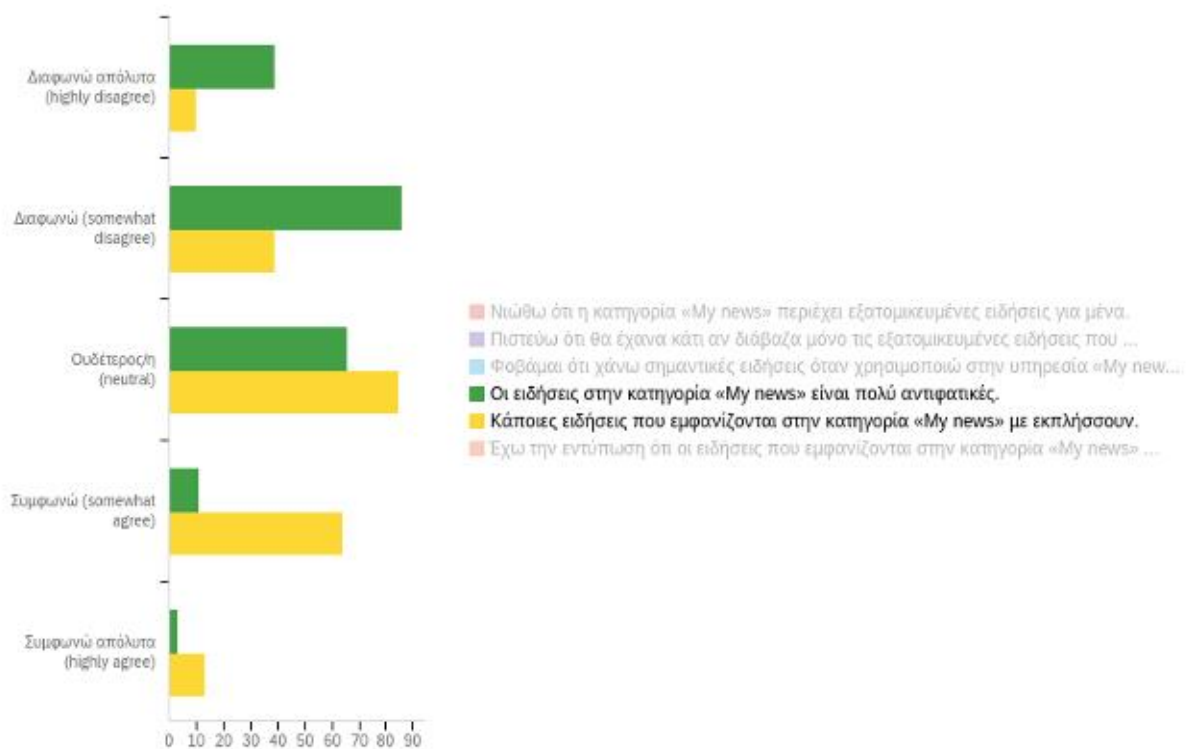


Figure 62: DIAS website-application respondents’ experience of the news offer in terms of diversity and the subjective feeling of being surprised (personalised group)

Experience of the news offer: subjective feeling of being surprised and the fulfilment of expeptations

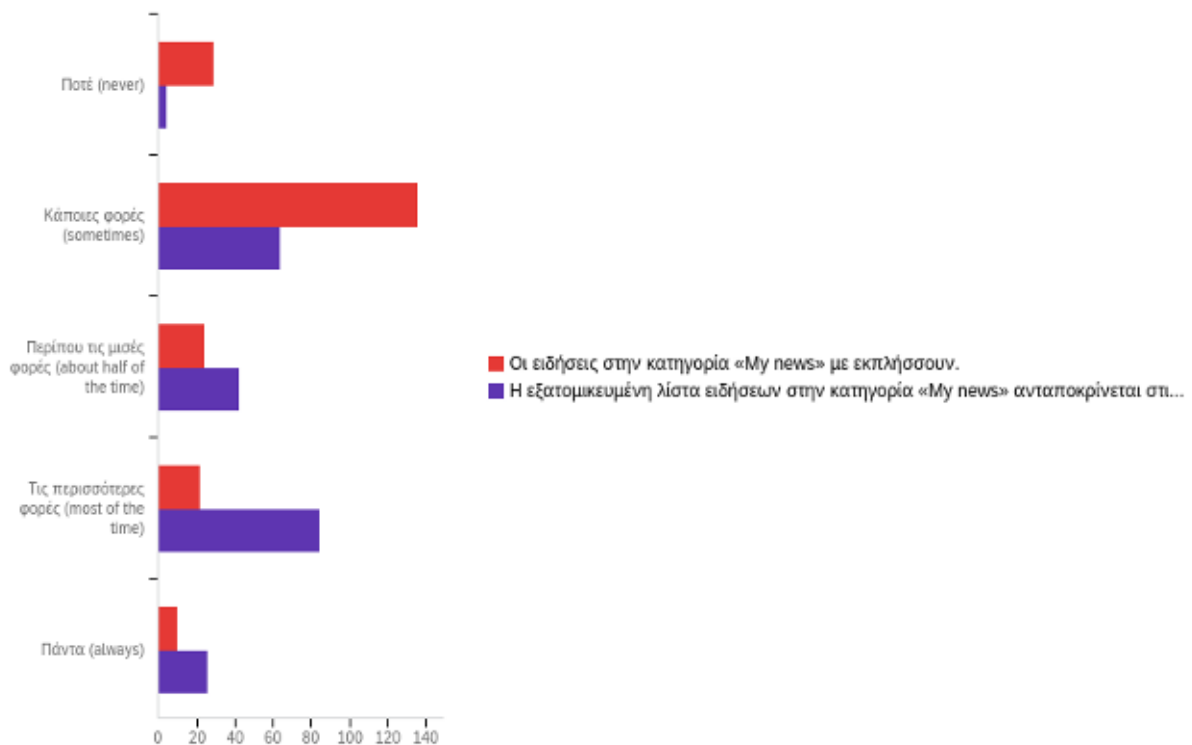


Figure 63: DIAS website-application respondents' subjective feeling of being surprised and the fulfilment of expectations (personalised group)

Experience of personalisation

Most DIAS website-application respondents (personalised group) somewhat agree that the 'my news' service contained a personalised news offer for them (101 of 218 responses, 46,33%). 43 respondents highly agree (19,72%), while 63 respondents feel neutral towards the statement (28,90%), seven respondents somewhat disagree (3,21%), and four respondents highly disagree (1,83%).



Experience of personalisation

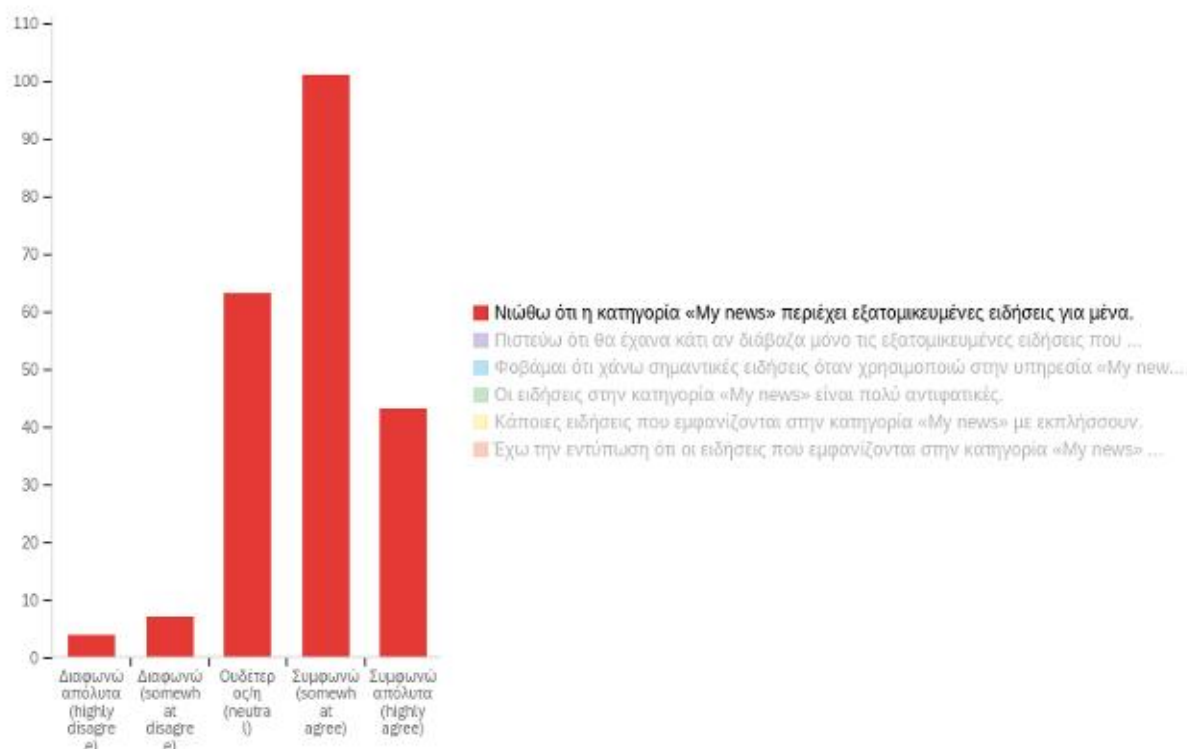


Figure 64: DIAS website-application respondents' experience of personalisation (personalised group)

News consultation via other news media

The DIAs website-application respondents (personalised group) indicate that they frequently consulted news via other news media with an average score of 7,42/10 (206 responses).

User-friendliness, ease of use, arrangement, and visual attractiveness of the app

Overall, the DIAS website-application respondents (personalised group) positively evaluate the user friendliness, ease of use, arrangement, and visual attractiveness of the CPN app:

- Red label: Most respondents somewhat agree that the app is user friendly (126 of 220 responses, 57,27%). 49 respondents highly agree (22,27%), while 38 respondents feel neutral towards the statement (17,27%), three respondents somewhat disagree (1,36%), and four respondents highly disagree (1,82%).
- Purple label: Most respondents somewhat agree that they find everything they are looking for easily in the app (115 of 214 responses, 53,74%). 45 respondents highly agree (21,03%), while 42 respondents feel neutral towards the statement (19,63%), eight respondents somewhat disagree (3,74%), and four respondents highly disagree (1,87%).
- Blue label: Most respondents somewhat agree that the app is well-arranged (123 of 216 responses, 56,94%). 40 respondents highly agree (18,52%), while 43 respondents



feel neutral towards the statement (19,91%), six respondents somewhat disagree (2,78%), and four respondents highly disagree (1,85%).

- Green label: Most respondents somewhat agree that the app is visually attractive (112 of 215 responses, 52,09%). 35 respondents highly agree (16,28%), while 56 feel neutral towards the statement (26,05%), seven respondents somewhat disagree (3,26%), and five respondents highly disagree (2,33%).

User friendliness, ease of use, arrangement, and visual attractiveness of the CPN app

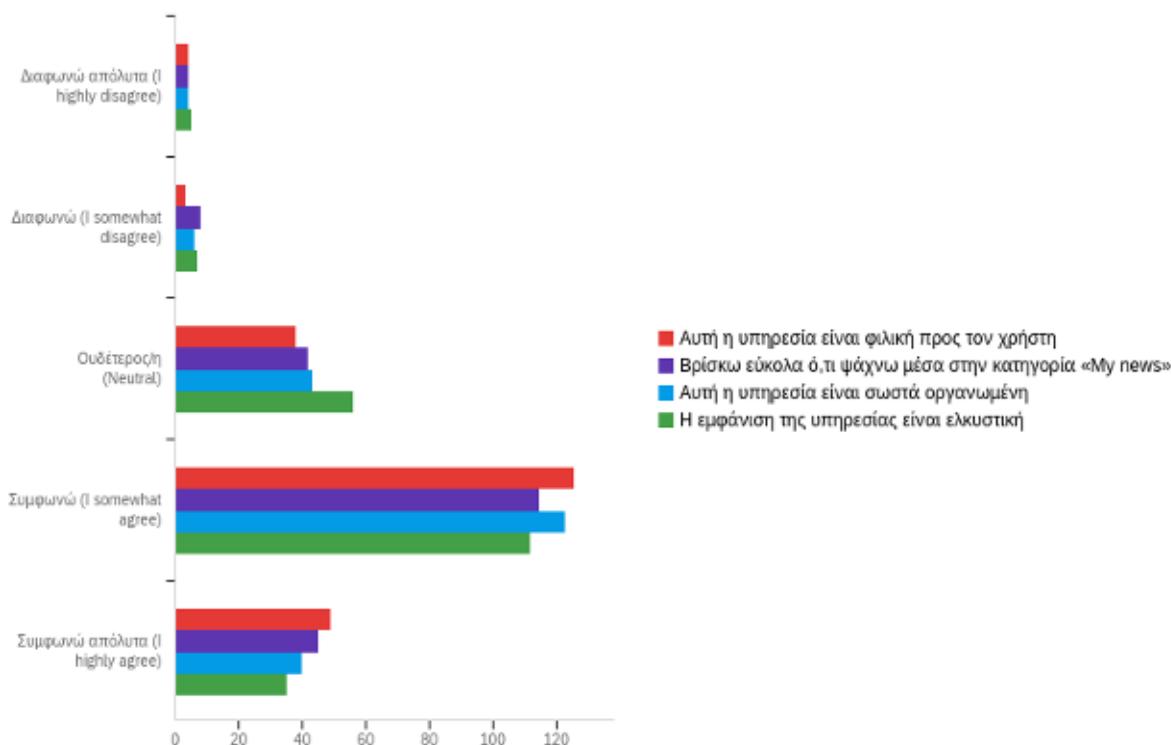


Figure 65: DIAS website-application respondents' evaluation of the user friendliness, ease of use, arrangement and visual attractiveness of the 'my news' service (personalised group)

Location of app usage

Most DIAS website respondents usually consulted the 'my news' service in a location depending on when they had time (111 of 227 responses, 48,90%). 98 respondents usually consulted the 'my news' service at home (43,17%). 14 respondents answered 'at work' (6,17%). Furthermore, four respondents marked the 'other' option (1,76%). Two of these four respondents explained their answer. One respondent stated that (s)he used the app "nowhere" and the other respondent answered that (s)he used the app "everywhere".

Technical functioning

Most DIAS website respondents indicate that the 'my news' service worked properly during the test (212 of 227 responses, 93,39%). On the other hand, 15 respondents answered that the 'my news' service did not work properly during the test (6,61%).



When asked to explain what went wrong, respondents stated for example, that they had the impression that the news feed was not personalised because they received sports news although they did not read such articles and are not interested in sports news. Other respondents stated that they expected the news offer to be more personalised or that the ‘my news’ service was “not as expected”. Some respondents complained that many things were repeated or that they received the same news two days in a row. One respondent indicated that “everything” went wrong without providing further explanation.

Future use of the ‘my news’ service

We inquired from the DIAS website-application respondents if they would like to use the ‘my news’ service again in the future. Most respondents indicated ‘certainly’ (92 of 224 responses, 41,07%). 88 respondents ‘think so’ (39,29%), 38 respondents answered ‘maybe, maybe not’ (16,96%), one respondents does not think they would use the ‘my news’ service again (0,45%), and five respondents indicate ‘certainly not’ (2,23%).

Would you like to use 'My News' again in the future?

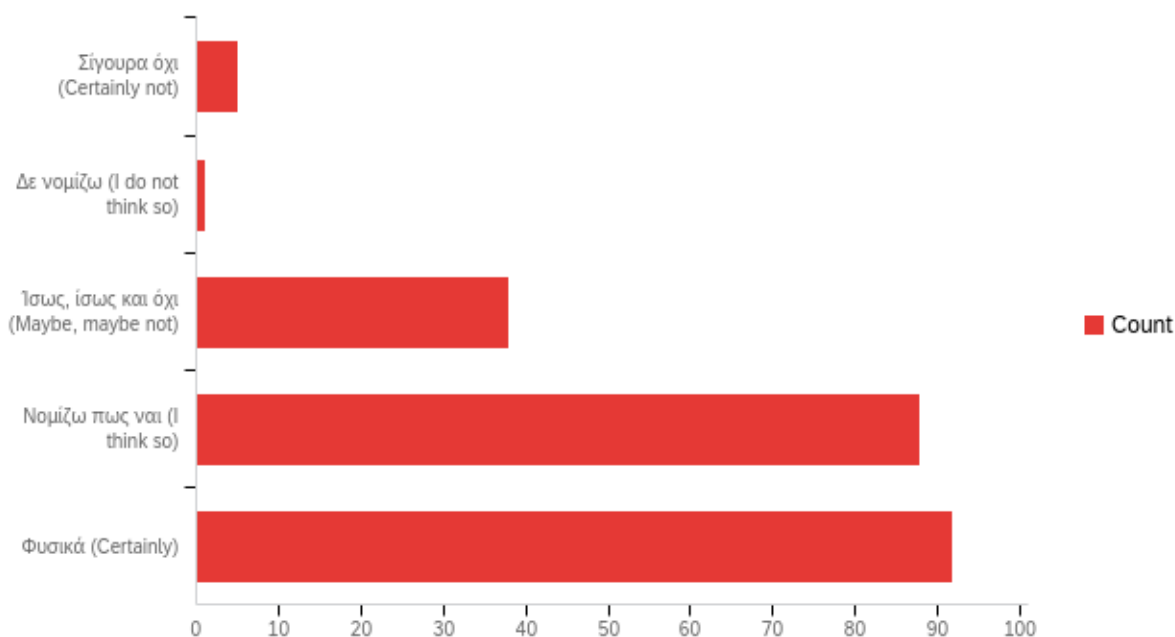


Figure 66: DIAS website-application respondents’ attitude towards using the CPN app in the future (personalised group)

Recommending the app to others

We asked the DIAS website-application respondents how willing they are to recommend the ‘my news’ service to others:

- Most respondents of the personalised group are *promoters*, meaning they are enthusiastic about the ‘my news’ service and are willing to recommend it to a friend or colleague (86 of 225 responses, 38,22%). These respondents rank their willingness to recommend the ‘my news’ service to others with an average score of 9,66/10.



- 79 respondents (35,11%) are *passives* and rank their willingness to recommend the ‘my news’ service to others with an average score of 7,54/10.
- 60 respondents (26,67%) are *detractors* who are unhappy about the ‘my news’ service, they are unlikely to use it again, and may discourage others from using it (average score of 4,77/10).

The NPS-score is 11,56 (% promoters - % detractors) and we conclude that overall, DIAS website respondents have a *medium* willingness to recommend the ‘my news’ service to friends or colleagues.

How likely are you to recommend the 'My News' service to a friend or colleague?

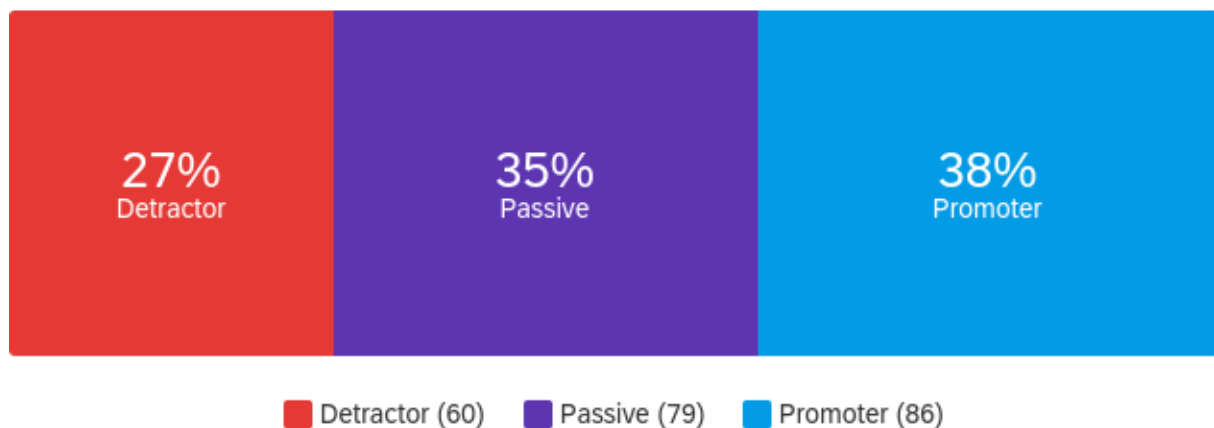


Figure 67: DIAS website-application respondents' willingness to recommend the 'my news' service to a colleague or friend (personalised group)

4.3.3.3 CPN app

a. User survey results

a. Weekly surveys

We recorded nine responses in Qualtrics. One response was a test user and was excluded from data-analysis. Additionally, two responses (finished = false) were excluded from analysis. We consider **six responses** (finished = true) as the final response count for the DIAS (CPN-app) weekly surveys. Qualtrics did not record the email addresses of the respondents to the weekly survey and consequently, we are not able to differentiate between the results of the personalised group and control group. We also remark that zero respondents completed the first and fourth weekly surveys, five respondents completed the second weekly survey, and one respondent filled in the third weekly survey. Therefore, it is not relevant to compare the survey results per week and we will discuss the **combined findings of the personalised group and the control group** of the second and third weekly surveys in the DIAS app. We analysed and reported the findings in a descriptive manner since there were too few responses to the DIAS (CPN-app) weekly surveys to perform further statistical analysis.

The table below shows the sociodemographic data of the DIAS (CPN-app) weekly survey respondents.

Table 17: Sociodemographic data of the DIAS (CPN-app) weekly survey respondents

Total response count	Gender	Age	Education
6	Male: 6	Mean age: 46 Minimum: 32 Maximum: 57	Master's degree: 1 Higher education degree: 4 High school degree: 1

Subjective feeling of being informed

The average score for the subjective feeling of being informed after reading the articles in the 'my news' tab for DIAS (app) respondents is 6,5/10 (six responses), on a scale ranging from 0 (not informed) to 10 (very informed).

Satisfaction of the need for news

An average score of 7/10 (six responses) indicates that the DIAS respondents' need for news was satisfied after using the app, on a scale ranging from 0 (not at all satisfied) to 10 (highly satisfied).

Fear of missing out

We inquired from the DIAS (CPN-app) respondents to what extent they experienced fear of missing out:

- Purple label: Most respondents somewhat agree that they would have missed something if they only read the personalised offer in the 'my news' tab (five of six responses, 83,33%). One respondent somewhat disagrees (16,67%).
- Blue label: 50% of respondents feel neutral towards the statement that they experienced fear of missing important news while using the app (three of six responses). One respondent somewhat agrees (16,67%), while one respondent somewhat disagrees (16,67%), and one respondent highly disagrees (16,67%).



Fear of missing out

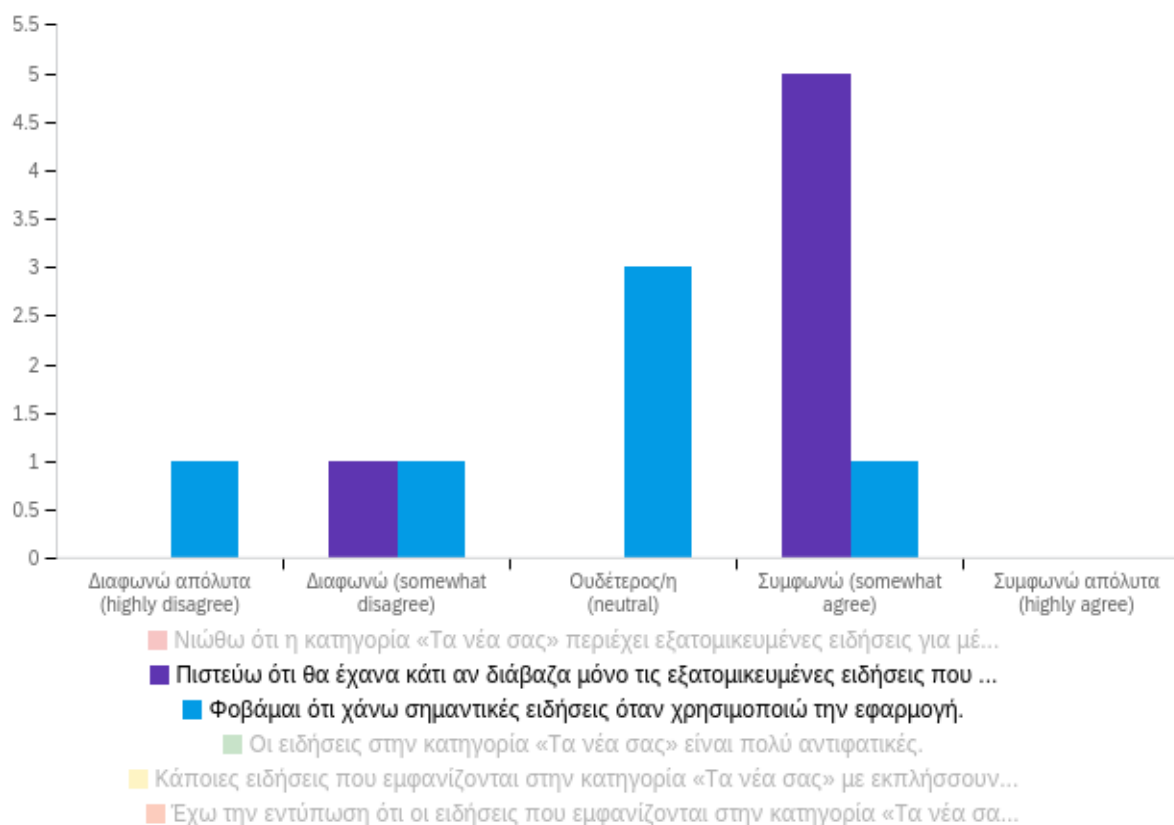


Figure 68: DIAS (CPN-app) respondents' fear of missing out

Filter bubble

Overall, the DIAS (app) respondents did not perceive a filter bubble. Two of six respondents highly disagree that they had the impression that the articles appearing in the 'my news' tab isolated them in their own cultural or ideological bubble (33,33%) and two respondents somewhat disagree (33,33%). Additionally, two respondents feel neutral towards the statement (33,33%).

Filter bubble

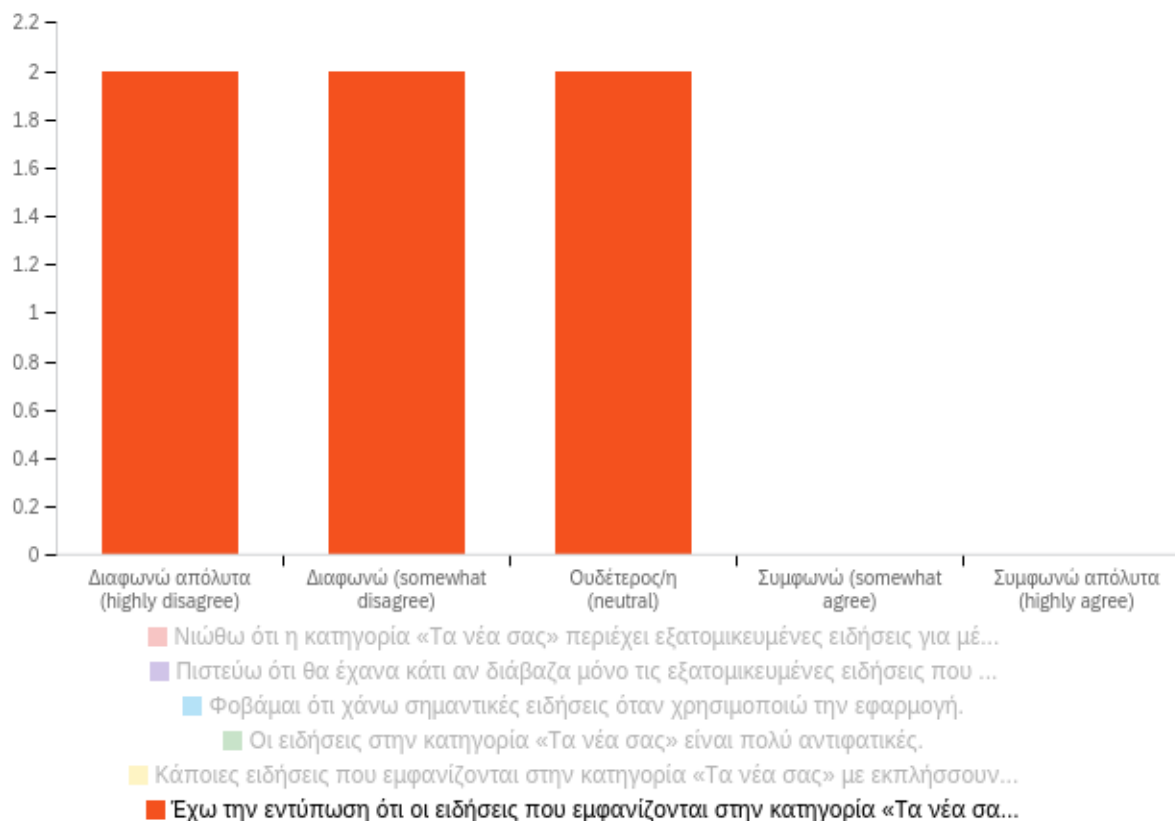


Figure 69: DIAS (CPN-app) respondents' perception of filter bubble

Experience of the news offer

We asked the DIAS (CPN-app) respondents to evaluate their experience of the news offer in terms of diversity, being surprised, how often the articles in the 'my news' tab surprised them, and to what extent their news expectations were met:

- Green label: Most respondents somewhat disagree that the articles that appeared in the 'my news' tab were diverse (four of six responses, 66,67%). One respondent highly disagrees (16,67%), while one respondent highly agrees (16,67%).
- Yellow label: 50% of respondents were not surprised by the articles that appeared in the 'my news' tab. One somewhat agrees that the articles that appeared in the 'my news' tab have surprised them (16,67%), two respondents feel neutral towards this statement (33,33%), two respondents somewhat disagree (33,33%), and one respondent highly disagrees (16,67%).
- Red label: When inquiring from the respondents how often the articles in the 'my news' tab surprised them, most respondents answered 'sometimes' (four of six responses, 66,67%). Two respondents indicated that the articles in the 'my news' tab 'never' surprised them (33,33%).



- Purple label: The list of articles in the ‘my news’ tab met the expectations of 50% of the respondents ‘about half of the time’, and ‘most of the time’ for the other 50% of the respondents (both three of six responses).

Experience of the news offer: diversity and the subjective feeling of being surprised

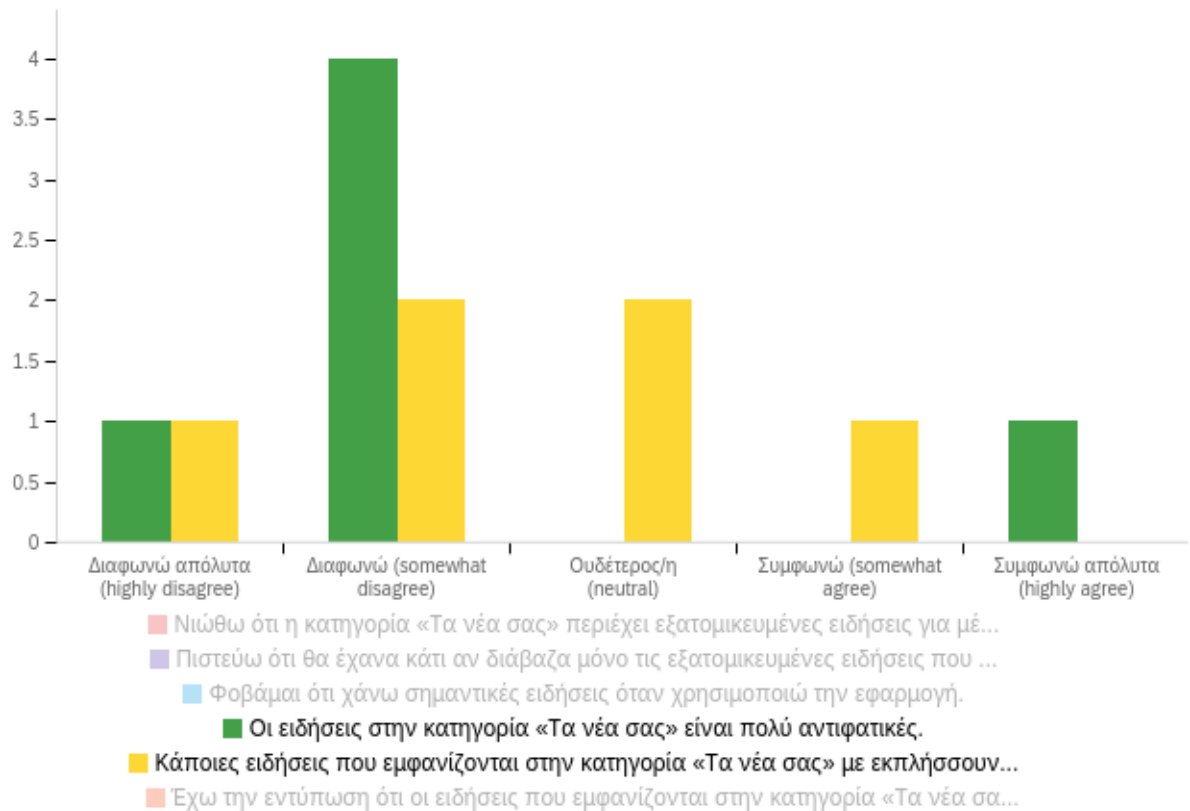


Figure 70: DIAS (CPN-app) respondents’ evaluation of the diversity of the news offer and the subjective feeling of being surprised



Experience of the news offer: subjective feeling of being surprised and the fulfilment of expectations

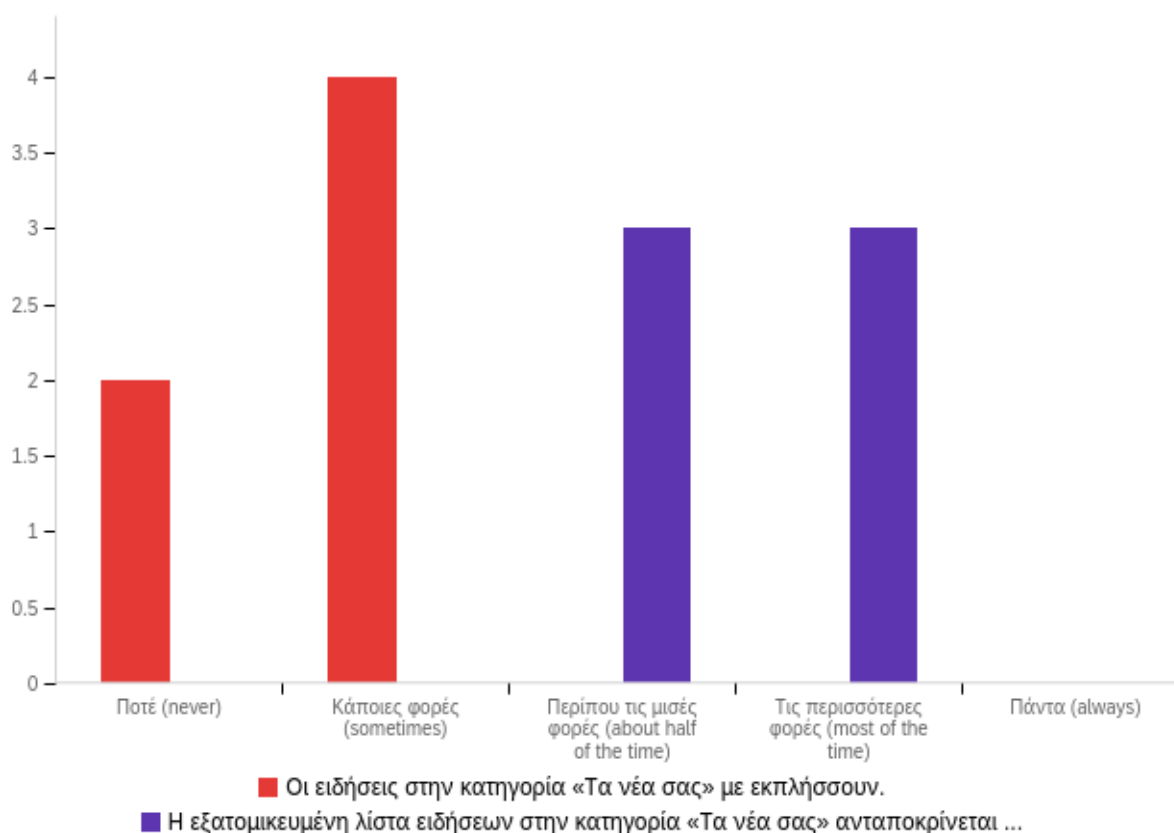


Figure 71: DIAS (CPN-app) respondents' subjective feeling of being surprised and the fulfilment of expectations

Experience of personalisation

Most DIAS (app) respondents feel neutral towards the statement that the 'my news' tab contained a personalised news offer for them (five of six responses, 83,33%). One respondent somewhat agrees (16,67%).



Experience of personalisation



Figure 72: DIAS (CPN-app) respondents' experience of personalisation in the 'my news' tab

Satisfaction with personalised news offer

Most DIAS (app) respondents are moderately satisfied with their personal list of news articles in the 'my news' tab (four of six responses, 66,67%). One respondent is slightly satisfied (16,67%), and one respondent is neither satisfied nor dissatisfied (16,67%).



Satisfaction with the personalised news offer in the 'my news' tab

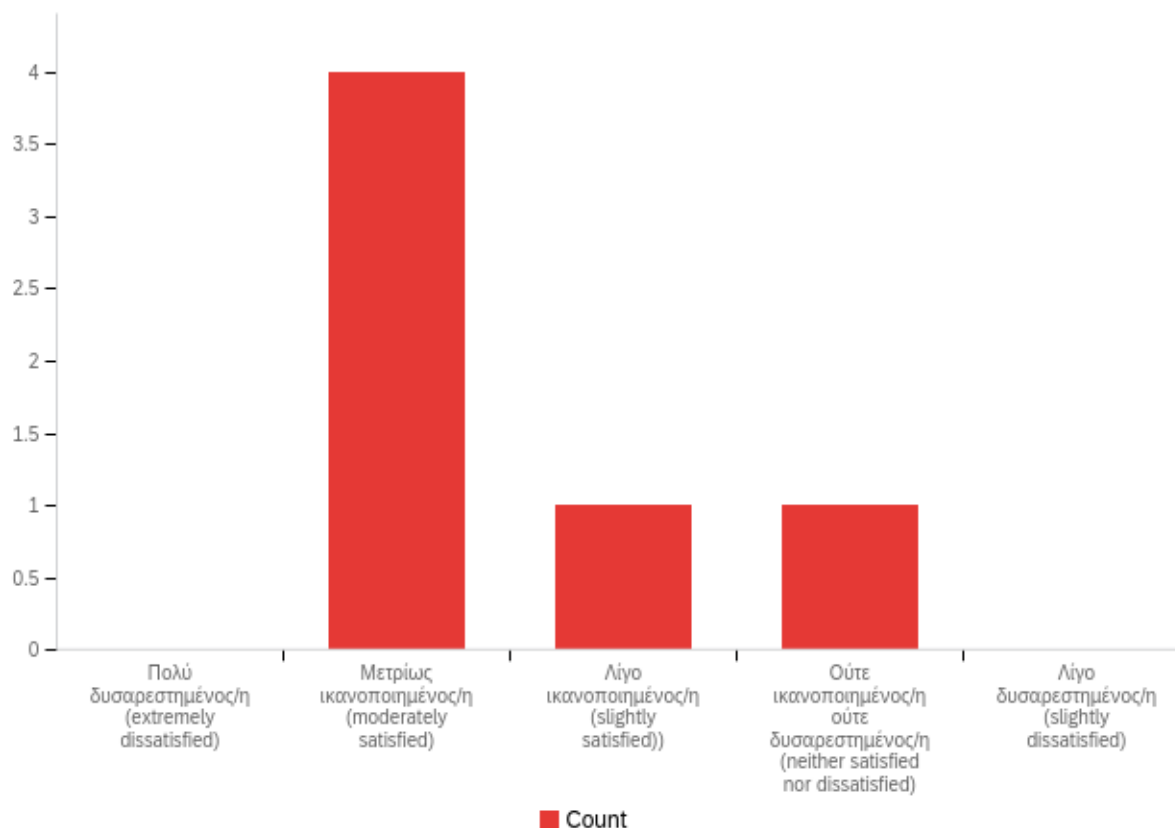


Figure 73: DIAS (CPN-app) respondents' satisfaction with the personalised news offer

News consultation via other news media

An average score of 7,33/10 (six responses) indicates that the DIAS (CPN-app) respondents frequently consulted news via other news media.

b. Final survey

We recorded ten responses in Qualtrics and excluded two responses (finished = false) from the data-analysis. We consider **eight responses** (finished = true) as the final response count to the DIAS (CPN-app) final survey. Five of eight respondents mentioned the email address that they used to log into the CPN app in the final survey. Two respondents of the personalised group completed the final survey and only one respondent from the control group. Due to this low response count we did not consider it relevant to differentiate between the personalised and control group when analysing the results of the DIAS (CPN-app) final survey. Correspondingly, we will discuss the **combined findings of the personalised group and the control group** of the final survey below. We analysed and reported the findings in a descriptive manner since there were too few responses to the DIAS (CPN-app) final survey to perform further statistical analysis.

Evaluation of the personal data receipt

Eight DIAS (CPN-app) respondents evaluated the personal data receipt:

- Four respondents (50%) do not perceive the PDR as a transparent approach towards data collection and processing. Three of four respondents score the PDR 6/10 and one respondent scores the PDR 5/10. Consequently, these four respondents are *detractors*. One detractor who scored the PDR 6/10 explains that the PDR is not a transparent approach “because the user cannot be sure that only the above personal data is processed. However, it is positive that the user has a clear description of how long they will be processed in an electronic document.”
- One respondent (12,5%) evaluates the PDR with a score of 7/10. This respondent is a *passive* which means they are happy with the approach but not happy enough to be considered a *promoter*.
- Three respondents (37,5%) positively evaluate the PDR. Two of three respondents score the PDR 10/10 and one respondent scores the PDR 9/10. These three respondents are *promoters* and are enthusiastic about the PDR.

In conclusion, the DIAS (app) respondents’ NPS-score for the personal data receipt is -12,5 (% promoters - % detractors). This is considered to be a *low* rating.

To what extent did you perceive the personal data receipt as a transparent approach towards data collection and processing?

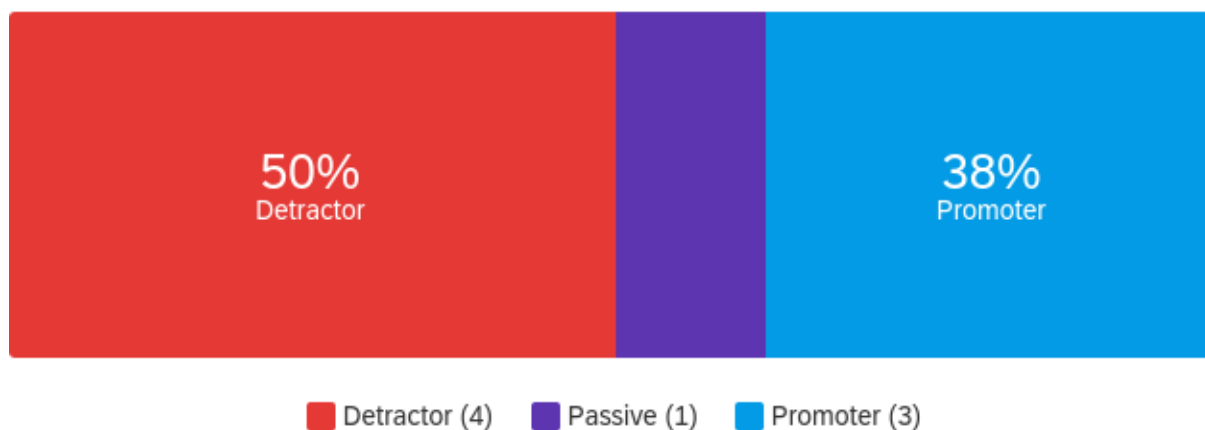


Figure 74: DIAS (CPN-app) respondents’ evaluation of the personal data receipt

Evaluation of the individual news streams

Eight respondents indicated to what extent they liked each news stream on a scale ranging from 0 (dislike) to 10 (like). The respondents scored the ‘my news’ tab on average 5,25/10. The ‘highlights’ tab received an average score of 5,88/10. The most liked tab was the ‘recent’ news stream with an average score of 6,5/10.

Satisfaction of the need for news

The respondents indicate that their need for news was satisfied after using the app with an average score of 7,63/10 (eight responses), on a scale ranging from 0 (not at all satisfied) to 10 (highly satisfied).

Subjective feeling of being informed

The respondents indicate that they felt informed after reading the ‘my news’ tab with an average score of 7,25/10 (four responses), on a scale ranging from 0 (not informed) to 10 (very informed).

Satisfaction with the relevance of the individual news streams

We inquired from the DIAS (CPN-app) respondents how they evaluated the relevance of the news articles in the individual tabs. Eight respondents completed this question:

- Red label: Most respondents were extremely satisfied with the relevance of the articles that appeared in the ‘**my news**’ tab (three responses, 37,50%), two respondents were somewhat satisfied (25%), two respondents were neither satisfied nor dissatisfied (25%), and one respondent was extremely dissatisfied (12,5%).
- Purple label: Four respondents were extremely satisfied with the relevance of the articles in the ‘**highlights**’ news stream (50%), two respondents were somewhat satisfied (25%), and two respondents were neither satisfied nor dissatisfied (25%).
- Blue label: Most respondents were extremely satisfied with the relevance of the articles in the ‘**recent**’ news tab (seven responses, 87,5%). One respondent was somewhat satisfied (12,5%).

We conclude that the ‘recent’ news stream was most positively evaluated of all three news tabs.



How satisfied were you with the relevance of the articles that appeared in each tab?

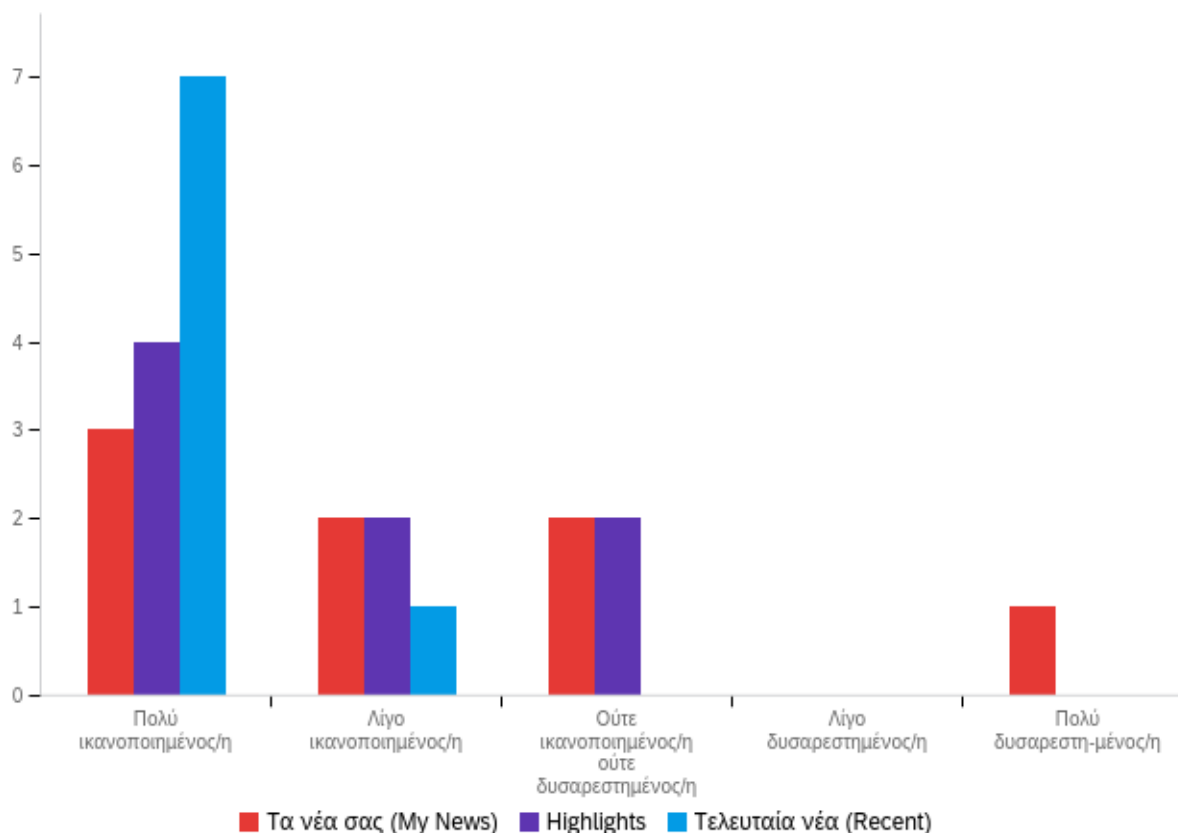


Figure 75: DIAS (CPN-app) respondent's satisfaction with the relevance of individual news streams

Attitude towards news personalisation

Eight respondents indicated their attitude towards news personalisation in general:

- Three respondents (37,5%) are enthusiastic about news personalisation. These three respondents assign a score of 10/10 to news personalisation and are considered to be **promoters**.
- Three respondents (37,5%) score news personalisation 7/10 and are **passives**.
- Two respondents score news personalisation 6/10 and are **detractors**. These respondents are unhappy about news personalisation and may discourage others from trying it.

We calculate an NPS-score of 12,5 (% promoters - % detractors) and conclude that DIAS (app) respondents assign a *medium* rating to news personalisation in general.



Indicate to what extent news personalization is unnecessary/useful?

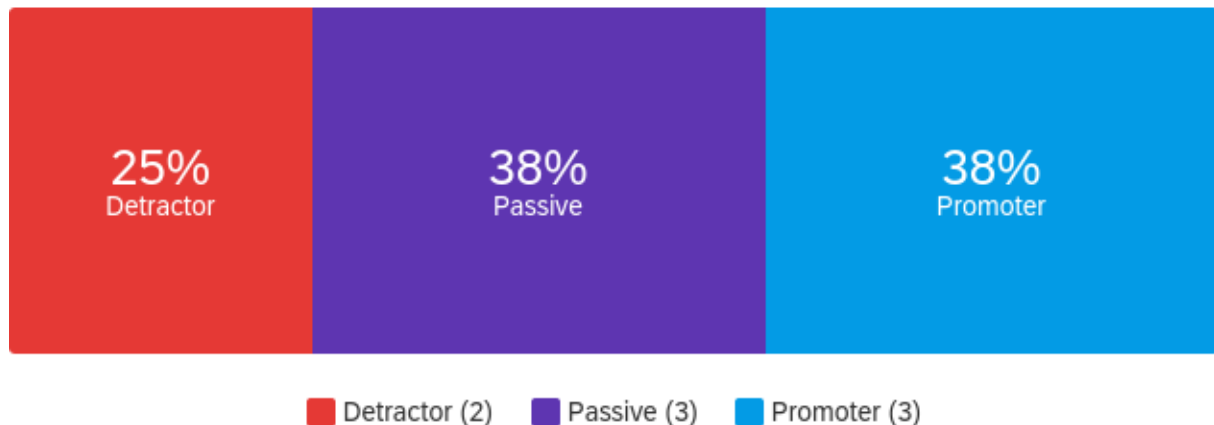


Figure 76: DIAS (CPN-app) respondents' attitude towards news personalisation

Fear of missing out

Eight respondents indicated to what extent they agree with the following statements, on a scale ranging from 1 (I highly disagree) to 5 (I highly agree):

- I believe I would have missed something if I only read my personalized news offer in the 'my news' tab;
- I experience fear of missing important news while using this app.

Considering the DIAS (CPN-app) respondents experience of FOMO:

- Purple label: Three respondents feel neutral towards the statement that they would have missed something if they only read the personalised news offer in the 'my news' tab (37,5%), while three respondents somewhat agree (37,5%), and two respondents highly agree (25%).
- Blue label: Most respondents somewhat disagree that they experience fear of missing important news while using the app (five responses, 65,5%), one respondent highly disagrees (12,5%), one respondent feels neutral towards this statement (12,5%), and one respondent highly agrees (12,5%).

We conclude that most DIAS app respondents think they would experience fear of missing out when only consulting the 'my news' tab.



Fear of missing out

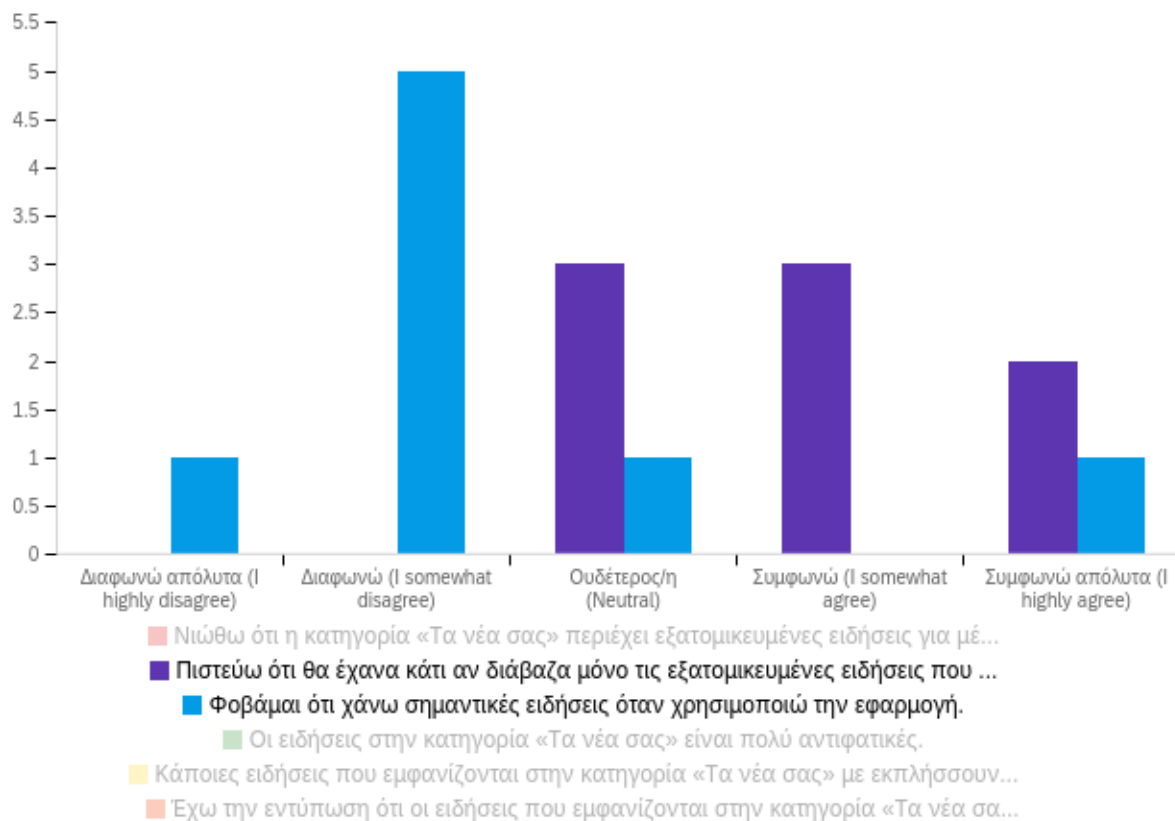


Figure 77: DIAS (CPN-app) respondents' fear of missing out

Filter bubble

We asked the DIAS (CPN-app) respondents to what extent they experienced a filter bubble when using the 'my news' tab. Most respondents somewhat disagree that the articles appearing in the 'my news' tab isolate them in their own cultural or ideological bubble (six of eight responses, 75%). One respondent feels neutral towards this statement (12,5%) and one respondent somewhat agrees (12,5%).

Filter bubble



Figure 78: DIAS (CPN-app) respondents' experience of filter bubble

Experience of the news offer

We asked the DIAS (CPN-app) respondents to evaluate their experience of the news offer in terms of diversity, being surprised, how often the articles in the 'my news' tab surprised them, and to what extent their news expectations were met:

- Green label: Three of eight respondents somewhat disagree that the news articles appearing in the 'my news' tab were very diverse (37,5%), on a scale ranging from 1 (I highly disagree) to 5 (I highly agree). One respondent highly disagrees (12,5%). Three respondents feel neutral towards the statement (37,5%), while one respondent somewhat agrees (12,5%).
- Yellow label: Most respondents feel neutral towards the statement that the articles that appeared in the 'my news' tab have surprised them (five of eight responses, 62,5%). One respondent highly disagrees (12,5%), one respondent somewhat disagrees (12,5%), while one respondent somewhat agrees (12,5%).
- Red label: Four of eight respondents indicated that the articles in the 'my news' tab have surprised them 'sometimes' (50%), one respondent answered 'most of the time' (12,5%), and three respondents said 'never' (37,5%).



- Purple label: Most respondents said the articles in the ‘my news’ tab met their expectations ‘most of the time’ (three of seven responses, 42,86%), two respondents said ‘about half of the time’ (28,57%), and two respondents answered ‘sometimes’ (28,57%).

Experience of the news offer: diversity and subjective feeling of being surprised

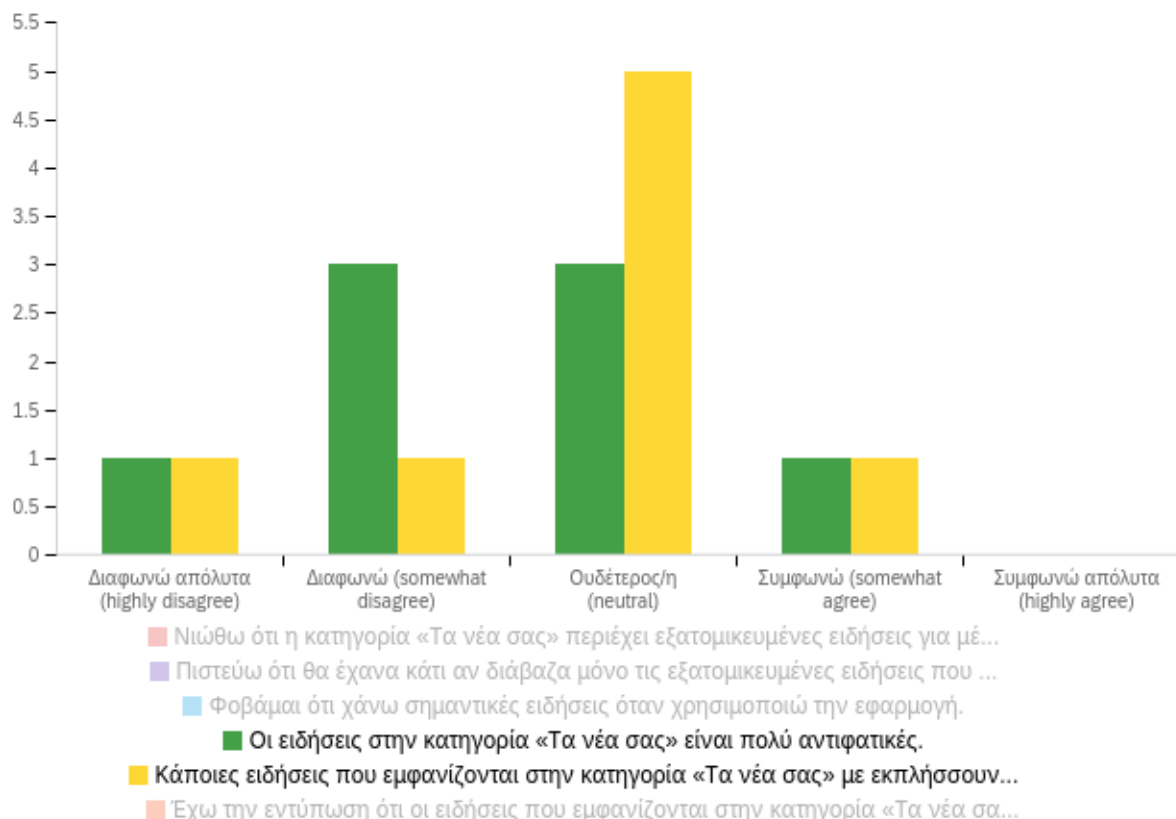


Figure 79: DIAS (CPN-app) respondents’ experience of the news offer in terms of diversity and the subjective feeling of being surprised

Experience of the news offer: subjective feeling of being surprised and the fulfilment of expectations

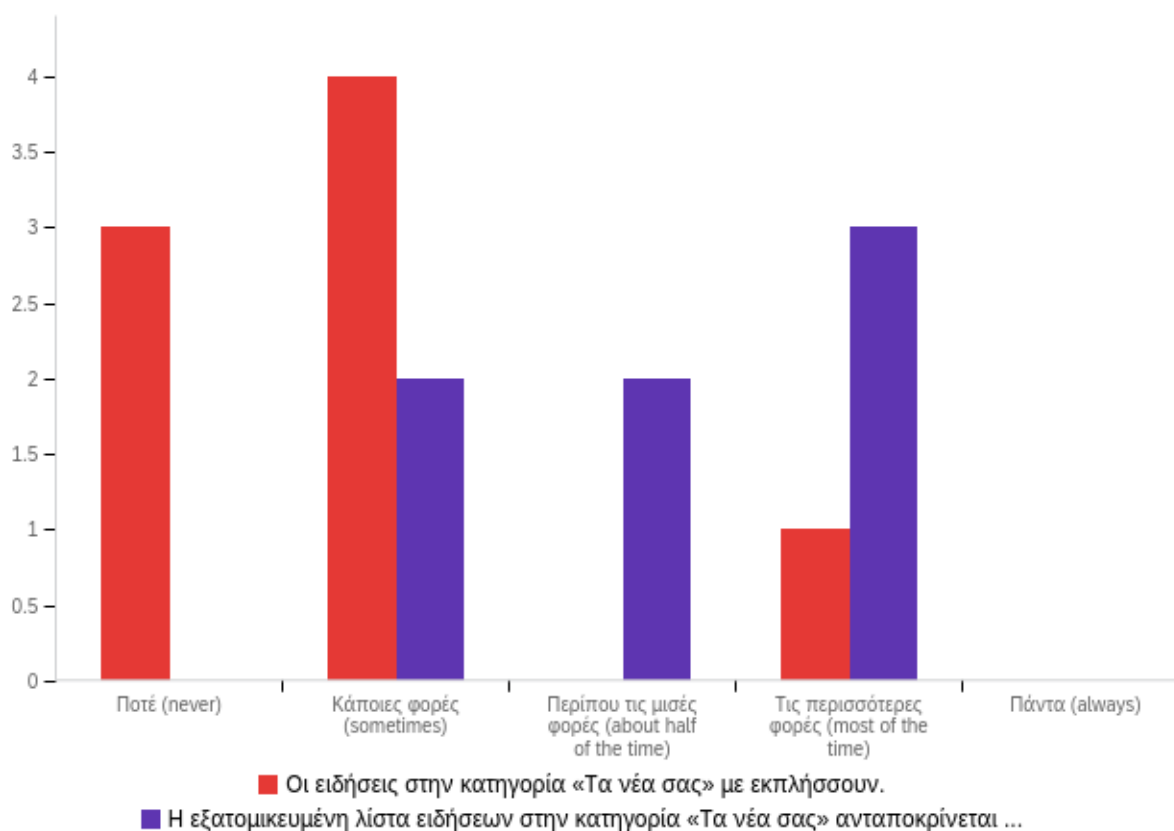


Figure 80: DIAS (CPN-app) respondents' subjective feeling of being surprised and their fulfilment of news expectations

Experience of personalisation

Four of eight respondents (50%) feel neutral towards the statement that the 'my news' tab contained a personalised news offer for them. Three respondents somewhat agree (37,5%), while one respondent somewhat disagrees (12,5%).



Experience of personalisation



Figure 81: DIAS (CPN-app) respondents' experience of personalisation

Location of app usage

Most DIAS app respondents usually consulted the CPN app in a place/location depending on when they had the time (seven of eight respondents, 87,5%). One respondent usually consulted the app at home (12,5%).

Technical functioning

Seven of eight DIAS respondents (87,5%) indicated that the app worked properly during the test. The one respondent who answered that the app did not work properly during the test explained that "it is not possible to comment on all the negatives that are waiting to be fixed with each new app update".

Satisfaction with the app

We asked the DIAS (CPN-app) respondents to what extent they were satisfied with the app in general. Most respondents are extremely satisfied (five of eight responses, 62,5%). One respondent is somewhat satisfied (12,5%), one respondent is neither satisfied nor dissatisfied (12,5%), and one respondent is extremely dissatisfied (12,5%).



How satisfied are you with the app in general?

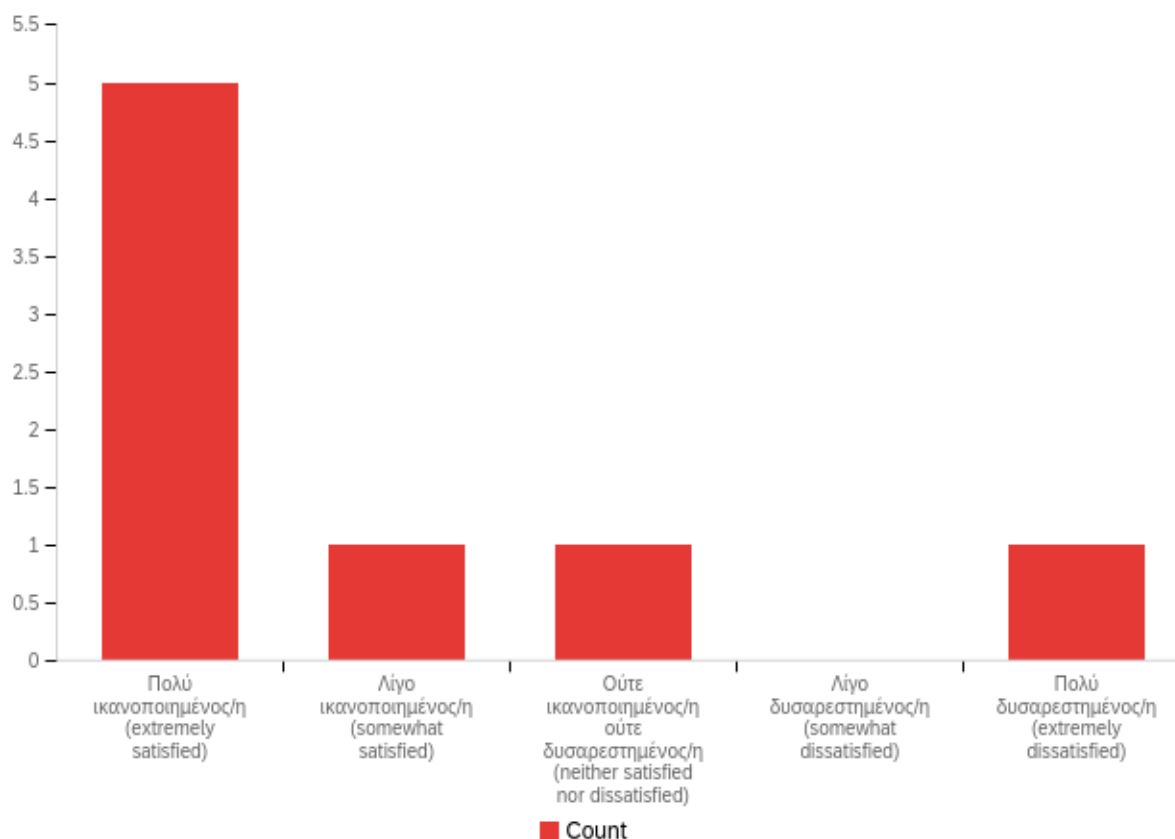


Figure 82: DIAS (CPN-app) respondents' satisfaction with the app in general

Satisfaction with personalised news offer

We inquired from the DIAS (CPN-app) respondents to what extent they were satisfied with the personalised news offer. Three of eight DIAS app respondents are somewhat satisfied with the list of articles that appeared in the 'my news' tab (37,5%). One respondent is extremely satisfied (12,5%), three respondents are neither satisfied nor dissatisfied (37,5%), and one respondent is extremely dissatisfied (12,5%).



How satisfied are you with your personal list of news articles in the 'my news' tab?

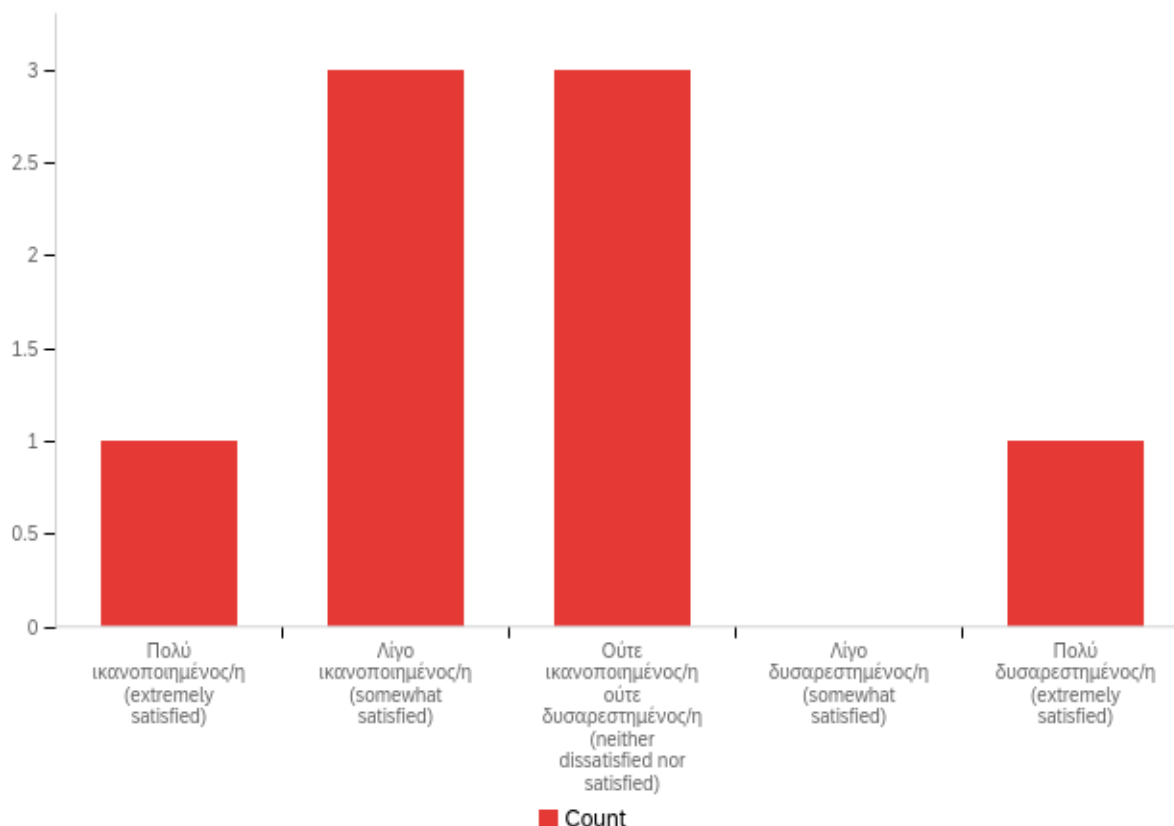


Figure 83: DIAS (CPN-app) respondents' satisfaction with the personalised news offer

News consultation via other news media

An average score of 6,71/10 (seven responses) indicates that the DIAS app respondents frequently consulted news via other news media.

User-friendliness, ease of use, arrangement, and visual attractiveness of the app

The DIAS (CPN-app) respondents positively evaluated the app in terms of user-friendliness, ease of use, arrangement, and visual attractiveness:

- Red label: Four of seven respondents somewhat agree that the app is user friendly (57,14%), two respondents highly agree (28,57%), and one respondent feels neutral towards the statement (14,29%).
- Purple label: Four of eight respondents feel neutral towards the statement that they find everything they are looking for easily in the app (50%), three respondents somewhat agree (37,5%), and one respondent highly agrees (12,5%).



- Blue label: Five of eight respondents somewhat agree that the app is well-arranged (62,5%), one respondent highly agrees (12,5%), while two respondents feel neutral towards this statement (25%).
- Green label: Six of eight respondents somewhat agree that the app is visually attractive (75%), one respondent highly agrees (12,5%), and one respondent feels neutral towards the statement (12,5%).

User friendliness, ease of use, arrangement and visual attractiveness of the CPN app

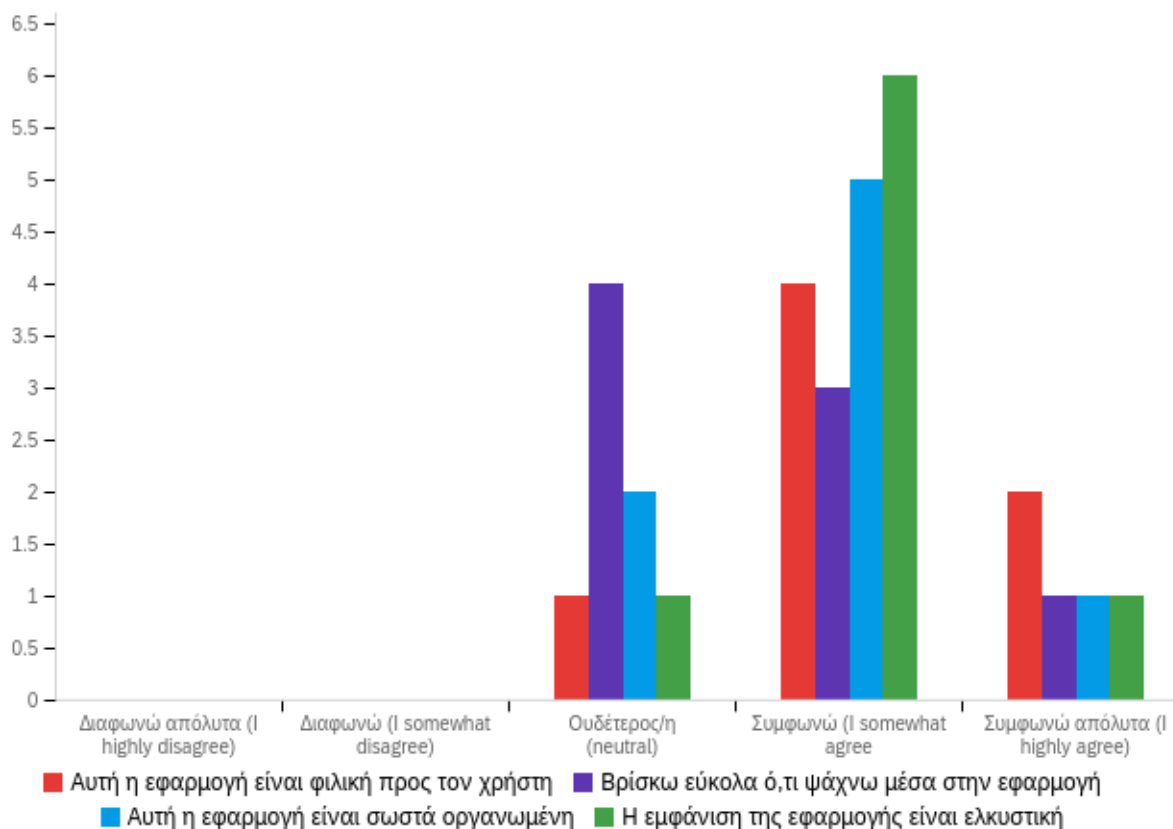


Figure 84: DIAS (CPN-app) respondents' evaluation of the user friendliness, ease of use, arrangement and visual attractiveness of the CPN-app

Future use of the CPN app

Four of eight DIAS app respondents (50%) think that they would like to use the CPN app even further in the future. Three respondents indicated that they certainly like to use the app again in the future (37,5%) and one respondent answered 'maybe, maybe not' (12,5%).



Would you like to use the CPN app even further in the future?

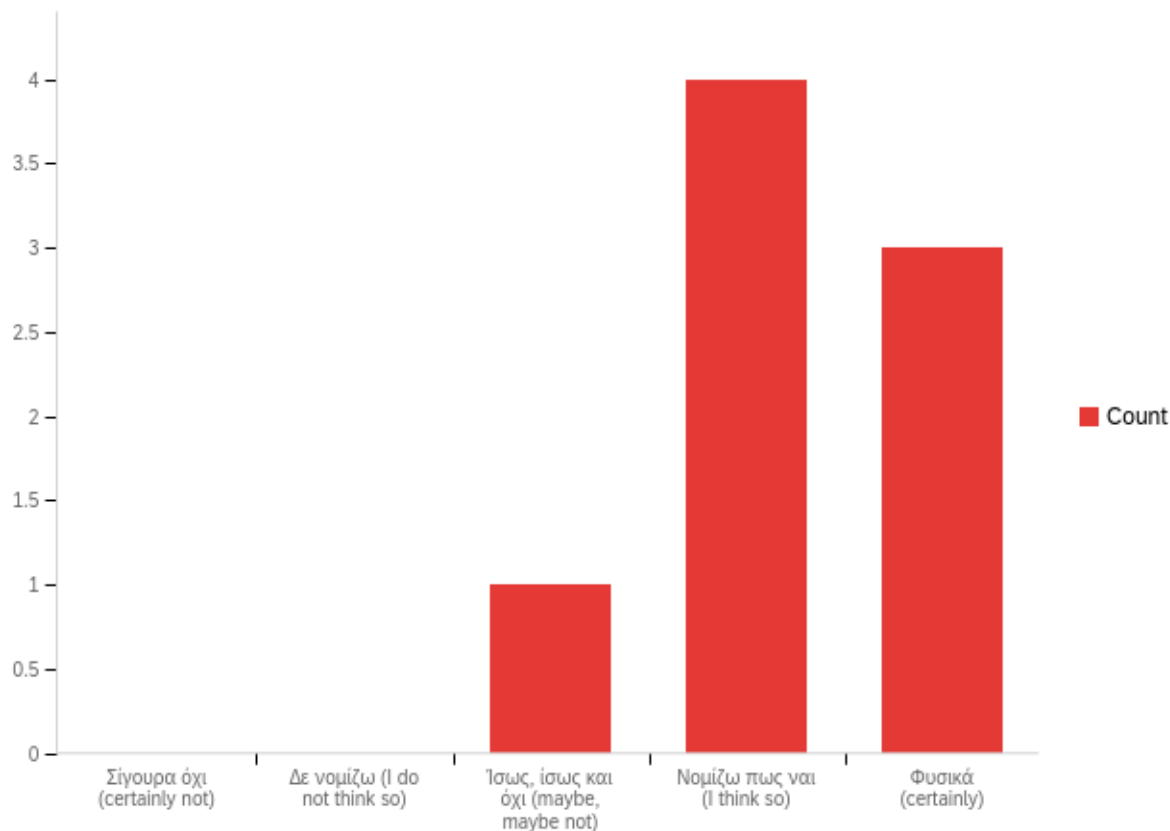


Figure 85: DIAS (CPN-app) respondents' attitude towards using the CPN app in the future

Recommending the app to others

We inquired from the DIAS (CPN-app) respondents to what extent they are willing to recommend the app to others:

- Three of eight respondents are enthusiastic about the CPN app and are likely to recommend the app to a colleague or friend (38%). These three respondents scored their willingness to recommend the app to others 9/10 and are considered as **promoters**.
- Three of eight respondents are **passives**, meaning that they are satisfied with the app but not happy enough to be considered **promoters**. Two of these three respondents score their willingness to recommend the app to others 8/10 and one respondent answered 7/10.
- Two respondents score their willingness to recommend the app to others 6/10 and 2/10. Consequently, these respondents are **detractors** who are considered to be unhappy users of the app, it is unlikely that they will use the app again, and they may discourage others from using it.



The NPS-score is 12,5 (% promoters - % detractors) and we conclude that DIAS app respondents have a *medium* willingness to recommend the CPN app to their colleagues or friends.

How likely are you to recommend this app to a friend or colleague?

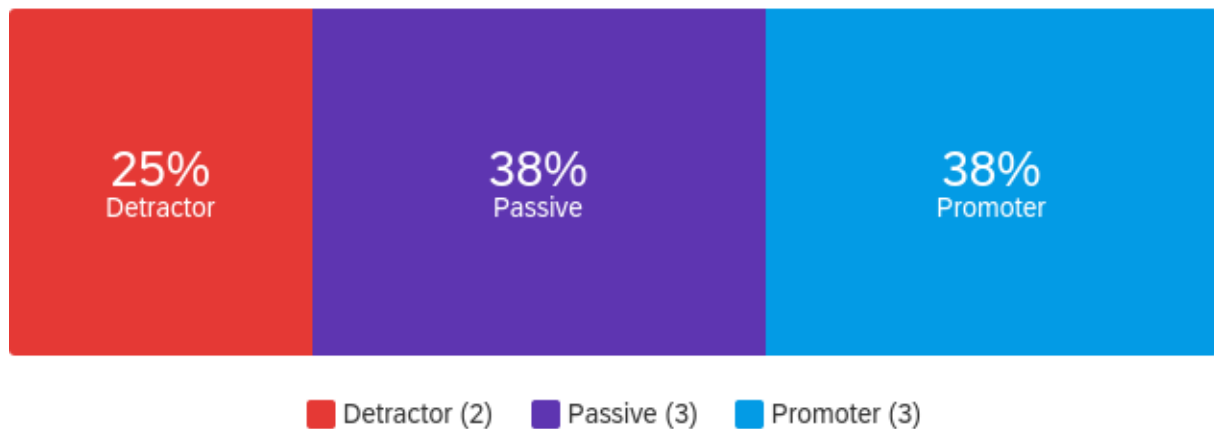


Figure 86: DIAS (CPN-app) respondents' willingness to recommend the app to a colleague or friend

c. Dropouts-survey

We recorded twelve responses (finished = true) to the dropouts-survey in Qualtrics. Most respondents indicate that 'after registering, I had forgotten that I had downloaded the app' (six responses, 50%). Secondly, respondents have 'other' reasons for not continuing to test the app (three responses, 25%) i.e., "I changed my device and I did not/forget to install the app on my new phone" and "I did not have much time to test the app". Some respondents indicated that 'the app was not working well enough' (two responses, 17%). One respondent answered that 'I only use a few apps and this app is not in my daily habit of use' (one response, 8%).

What is (are) the main reason(s) why you did not continue testing this app? Indicating multiple answers is possible.

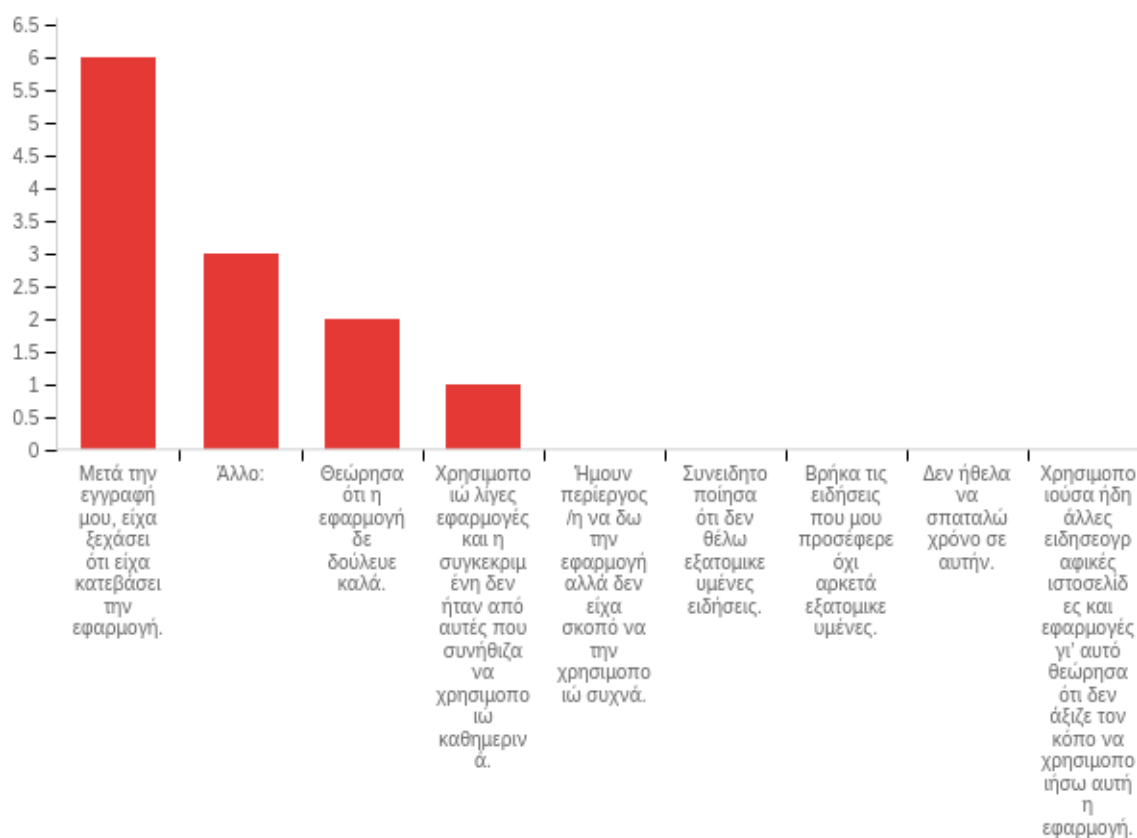


Figure 87: Main reasons of the DIAS respondents for not continuing to test the CPN-app

b. Qualitative interviews

Following the five weeks of pilot evaluation, the user partners in Cyprus (DIAS) reached out to the participants of the CPN app in order to invite them for a live round of feedback in individual qualitative interviews. In the following parts, we will discuss different important findings regarding the CPN recommender.

DIAS proceeded with personal interviews of the users. 6 users were interviewed. The interviews were conducted via telephone call due to coronavirus lockdown.

The following results came out of the discussions:

First impressions

Most users stated that the app was simple and easy to use. A statement which was heard from the majority of the users was that categories and subcategories were missing. It seems that users tend to seek for categories of news to choose from, just like they do now while they are browsing a website. Furthermore, users noticed the lack of a Headline stream. In addition, the users had the perception that the news they were reading in the app was not the same as the

content they are used to read at SigmaLive. Some of the users said that they were reading old and outdated news and in addition they were not satisfied with the available number of articles. A user said that the app was useful as he found the idea interesting to receive the news that suits him without wasting time to search for them. That was the main reason he wanted to participate. Another one expressed the same opinion as long as the recommender works properly.

Positive points

First, the respondents were asked what they liked about the app. The dominant statement was that the app was simple and easy to use. The interface was nice and the way the news was presented was helpful to the user to understand from the big photo and the summary if the article was relevant or not. In general, the users were satisfied with the 3 streams and there was a positive reaction about the personalized stream. A user noticed and liked the button on the right top of the screen which was reading with a voice the titles of the articles by pressing it.

The swipe feature received very good comments as it was an easy way to show which articles were interesting and which not.

Negative points

Something that was heard from most of the interviewees was that there was a delay in the loading of the pages especially when they were pressing the back button. In addition, when they finished reading an article and were pressing back, to go to the stream they were before, instead of getting them to the point they were, the app was taking them to the very beginning of the page. Some also mentioned that the personalized stream was not frequently renewed - old news in the personalised stream.

No regular and frequent news flow, slow update that's why the user was reading more news sources.

An important issue that emerged from the interviews was the disappointment of the users with the content related to their expectations from the website. Many users had the perception that the news they were reading in the app was not the same with the content they are used to reading at SigmaLive. It was also stated as a disadvantage of the app, the fact that you could not undo a choice you made by mistake (interested/not interested articles by swiping).

What's missing

The dominant statement was that the categories and subcategories were missing. A user stated that he would like to initially choose his preferences and interests among thematic categories and subjects. It was also heard that they missed the environment of SigmaLive, the branding and thus, the sense of trust and validity. The absence of notifications was noticed by two users and the search button as well. A user suggested that content from other news sources could be included in the app (news aggregator) and another one made a suggestion to add a bot with the most frequent questions together with the answers. A user said that he would like to have the ability to go to the very first article of a specific topic that he was currently reading in order to read a point that he missed.



Most of the users would like to have a feature, operating like the swipe feature but to throw away or hide the articles they have already read.

Overall feedback on personalisation

Feedback on the three streams

DIAS used the following streams. ‘Your news’, ‘Highlights’ and ‘Latest news’

All users said that they were satisfied with the streams of the app. As one participant stated, all the 3 streams are useful because this increases the criteria for the app to understand the user's behaviour and provide him suitable content. However, most users were interested in the ‘Your News’ and ‘Latest News’ streams and only one mentioned the Highlights. One user expressed his opinion that the ‘Highlights’-stream was not so important for him as he had the perception that in this stream there were the most popular and not the most important news. Most of them noticed that latest news and highlights streams were updated frequently but the personalised stream not bringing updated news content.

Users’ replies as quoted:

“I was using the personalised stream and the Latest news because my news was not regularly updating.”

“Personalised stream was useful, helpful and satisfying. If I had doubts that I missed something important I was visiting the latest news stream or in case I wanted to see something different, apart from my interests.”

“I liked the personalised stream more and my news were getting more personalised during the testing period. I was feeling sufficiently informed but in case I wanted to see something else I was checking the latest.”

“A combination of personalised and latest news. I liked the fact that I could easily be informed about what was currently happening around with the latest news stream.”

“Between my news and the latest news I would choose the personalised only if I knew that the algorithm works properly. Then I would be satisfied with my news and I would only scroll on the news of the ‘Latest news’-stream.”

Feedback on the Personalised stream

Users said that they need a personalized stream. Most of the time they do not have enough time to follow current news or search for interesting articles. However, they want to have the option to see other feeds in order to tackle their fear of missing out. Some said that they have the feeling that the feed is outdated as some news articles were “yesterday’s news”. They also added that they were not receiving personalised news, expressing their dissatisfaction with the recommender.

Users’ replies as quoted:

“It is really helpful when you don’t have much time to spend on reading.”



“I was satisfied, it was interesting, as long as I was using it, it became more personalized but to feel fully informed I wanted to check the other streams to have a spherical view. For example, on the highlights you could discover something interesting that you wouldn’t see in your stream.”

“The recommender was not working properly; it kept serving me articles related to sports despite the fact that I was not interested and was not reading that kind of news. On the other hand, the latest news were more updated than the personalised stream as some important international news of my interest were included in the latest news but not in my news. My expectations were beyond what I actually received in terms of personalisation.”

“Not satisfied at all with this stream. I was missing important news and instead I was receiving news that was not interesting for me.”

“It was not fully serving personalised content. There was a big amount of sports articles and some of them were more specific and did not match my interests. There was no balance. “

“I liked my personalised stream although it was not working 100% but only to an extent because I kept receiving articles that were not of my interest.”

Opinion on News personalisation in general

In the question of personalisation made them feel better informed, two users were feeling informed to some extent but most of the users said that they were not feeling better informed while using the personalized feed. Even if the personalized stream had all their preferred articles, they still had the perception that they were missing out important articles and that they were reading an outdated newsfeed. That is the reason they were searching for more news in the stream with the latest news. Moreover, a participant highlighted a different aspect. He stated that if he only navigates in the personalized stream, then he feels that he misses the chance to know if a totally different subject might interest him as well. That is because the algorithm will never give him articles on that subject, if he never gave to the app a hint/clue that he might like something like that. On the contrary, a user expressed her feeling of satisfaction as the idea of having a stream that concentrates all the articles that might interest her, gives her the opportunity to read more in less time.

Generally speaking, a user expressed his disagreement as he doesn’t like the idea of strict personalisation because people change and so are their preferences. He doesn’t want the app to serve him articles based on its first assumptions regarding his interests as those might change from one day to another. One participant stated that he would not feel fully informed using a personalized news app, only a combination could work.

Most of the users said it is useful, helpful, a need, interesting, ideal, an important initiative, and they seem to enjoy the idea that one day they will read more articles relevant to their interests. Most users replied yes but only if it fulfils their expectations in news reading.

Users’ replies as quoted:

“Yes, if I could adjust this to my life and preferences why not? But I would still need something more than just a personalised stream because we are always looking for a general



overview of what is happening. This app could not replace my main news source. Also, for double crossing the authenticity of the news, in the fear of fake news.”

“Yes I would definitely try this in real life and it could replace my main news source as long as it achieves its goal, plus the quality and flow will be sufficient.”

“Yes I would use it for a quick update, to get the information I need quickly. It is also a very useful tool for journalists or professionals that are specialized in a specific content (financial, politics etc.).”

Most users answered that the CPN app could replace existing news sources but under certain circumstances. A user highlighted that it depends on the efficiency of the recommender. In particular, he analysed his opinion by saying that if this platform could use content from different sites and different countries' media organisations and secondly if it was more interactive, would give suggestions with related articles from different sites to have a more spherical view.” This was also mentioned again as some think that it is important to have feeds from other publishers local and worldwide. Others said that categories are really important in order to filter out some of them like Sports for instance.

Feedback mechanisms

Most of the participants found the swipe feature really useful and handy, as not many apps have a feature like this available. A user stated that he liked the fact that he had two folders with his favourite articles, in case he wanted to read again an article of them. Another one said that is a very clever feature, only if the feedback it's taken into account. They noted that it was unable to offer the “undo” option. So they didn't have the chance of undoing any choice made by mistake. One participant did not quite understand how the swipe feature was operating at the beginning. It took him some time to understand its use and another did not notice this operation, so he had not used it at all.

Other ways of giving feedback

The users expressed their satisfaction with the swipe feature. Another way of rating could be the button Like / Don't like at the end of each article, which was mentioned from three users. On the other hand, one user said that the app should understand if he liked an article from the time spent on it, meaning if he completed reading it. If he just clicked and then closed that article, that means that he did not like it.

FOMO

Most of the participants expressed the view that it is hard to find a balance between getting an overview of the headlines of the day, and not miss out other relevant items. However, they think that it is possible with the right technology to achieve it. One participant said that is possible to be done by perfecting the personalization algorithm. In addition, most of them proposed to provide in the app two streams of articles, the Personalized and the Latest. The personalized feed will give opportunity to the user to explore the articles of his preference while at the same time will have the chance to switch to the latest news which must be an updated feed of the current news similar to what they see in the website. As a conclusion, a combination of two or three streams will be ideal to feel fully informed.



On the other hand, two expressed that they were feeling well informed and did not have the fear of missing out something important. More specifically, one stated that he would like to check the other streams too, not because of the FOMO, but in case he had more free time, he would like to take a look at the ‘latest news’-stream in order to read something different.

4.3.3.4 DIAS user research conclusions

a. DIAS website application

Four weekly surveys and one final survey were distributed to the end users who registered via the DIAS website for the third CPN pilot testing phase of the ‘my news’ service. All the users who logged into the DIAS website were allocated to the personalised group. The response count for the weekly surveys was 1036 responses and 227 responses for the final survey.

Did the respondents feel informed after using the ‘my news’ service?

The findings of the final survey suggest that the **respondents felt informed after reading the articles in the ‘my news’ service on the DIAS website**. In addition, the results of the weekly surveys show that the respondents’ subjective feeling of being informed increased each week of the third CPN pilot.

Was the respondents’ need for news satisfied after using the ‘my news’ service?

The findings of the final survey indicate that the **DIAS website respondents’ need for news was satisfied after reading the articles in the ‘my news’ service**. This result is confirmed when considering the findings of the weekly surveys, the satisfaction of the need for news of the DIAS website respondents increased each week of the third CPN pilot.

To what extent did the respondents experience fear of missing out?

The results of the weekly surveys show that most DIAS website respondents somewhat agree that they would have missed something if they only read the personalised offer in the ‘my news’ service on the DIAS website. On the other hand, most respondents somewhat disagree that they experienced fear of missing important news while using the ‘my news’ service. These results are similar to the findings of the final survey. Considering the fact that all the DIAS website respondents received a personalised news offer, the findings of the surveys suggest that the **respondents only experienced fear of missing out on something if they were made aware that the news offer was personalised**.

To what extent did the respondents experience a filter bubble?

The results of the weekly surveys indicate that most DIAS website respondents somewhat disagree that the articles that appeared in the ‘my news’ service isolated them in their own cultural or ideological bubble. These results are similar to the findings of the final survey. Consequently, we conclude that **although the DIAS website respondents received a personalised news offer, they did not experience a filter bubble when using the ‘my news’ service**.



How did the respondents experience the news offer in terms of diversity, being surprised and fulfilment of their expectations?

The results of the weekly surveys showed that most DIAS website respondents somewhat disagree that the articles that appeared in the ‘my news’ service were very diverse. Most respondents feel neutral towards the statement that the personalised news offer has surprised them. In addition, most respondents answered that the articles that appeared in the ‘my news’ service surprised them sometimes. In addition, most respondents stated that the personalised news offer met their expectations most of the time. These results are similar to the findings of the final survey.

How did respondents experience the personalised news offer? To what extent are the respondents satisfied with the personalised news offer?

The findings of the weekly surveys indicate that most respondents feel neutral towards the statement that the ‘my news’ service contained a personalised news offer for them. In addition, most respondents are moderately satisfied with the list of personalised news articles in the ‘my news’ service. These results are quite different from the findings of the final survey in which most respondents somewhat agree that the ‘my news’ service contained a personalised news offer for them. The final survey respondents also indicate that they were extremely satisfied with their personalised news offer. In terms of evaluation of the effectiveness CPN-recommender, these survey findings suggest at least that the **DIAS website respondents perceived the news offer as personalised and they were satisfied with the level of personalisation.**

To what extent are the respondents satisfied with the ‘my news’ service in general? Would respondents like to use this service again in the future? Are they willing to recommend it to others?

Overall, the findings of the final survey indicate that **most DIAS website respondents were extremely satisfied with the ‘my news’ service in general.** We highlight that most respondents indicated that the ‘my news’ service worked properly during the test. In addition, the DIAS website respondents positively evaluate the user-friendliness, ease of use, arrangement, and visual attractiveness of the ‘my news’ service.

This is probably why most DIAS website respondents answered that they would certainly like to use the ‘my news’ service again in the future. Furthermore, most respondents are enthusiastic about the ‘my news’ service and are willing to recommend to a friend or colleague.

b. DIAS (CPN-app)

Four weekly surveys and one final survey were distributed to the end users of the CPN-app with DIAS news content. The total response count for the weekly surveys was six responses. The online survey platform Qualtrics however did not record the email addresses of the respondents to the surveys. Consequently, we were not able to differentiate between the survey results of the personalised group and the control group. The total response count for the final survey was eight responses. Five of eight respondents mentioned the email address that they used to register in the CPN app, from which only two users were allocated to the



personalised group and one respondent in the control group. The other two users were unknown. Consequently, we analysed and reported the survey findings on an overarching level. Due to the low response count, it was not relevant to differentiate between the survey findings of the personalised group and the control group. In addition, we analysed and reported the survey findings in a descriptive manner since there were too few responses to the DIAS (CPN-app) weekly and final surveys to perform further statistical analysis.

Be that as it may, we were able to enrich the quantitative results with the qualitative data that resulted from additional interviews that were conducted with six DIAS app users after the pilot testing phase. This allowed us to write the conclusions below supported by both quantitative and qualitative user insights.

Did the respondents feel informed after reading the ‘my news’ tab?

The results of the weekly surveys show that the DIAS app respondents subjectively felt informed after reading the articles in the ‘my news’ tab. This result is confirmed by the findings of the final survey. Considering the insights from the qualitative interviews however, most users said that they were not feeling better informed while using the personalized feed. The feeling of not being informed was mostly related to the perception that they were missing out on important articles. In addition, the interview respondents felt that they were reading an outdated newsfeed. It is not clear if the respondents of the interviews are the same respondents who completed the surveys.

Based on these evaluations we cannot conclude if personalisation actually leads to a subjective feeling of being informed. Yet, these findings suggest that **if users are not feeling informed when reading a personalised news offer, this might be related to their perception of fear of missing out as well as to the extent in which the personalised news offer is up to date**. In addition, we point out that one of the interview respondents mentioned that “to feel fully informed I wanted to check the other streams to have a spherical view”. This suggests that **if users read all three individual news streams in the CPN app and consume both personalised and non-personalised news content, the feeling of being better informed is higher than when they only consume a personalised news offer**.

Was the respondents’ need for news satisfied after using the app?

The results of the weekly surveys show that the **DIAS app respondents’ need for news was satisfied after using the app**. This result is confirmed by the findings of the final survey.

How did the respondents evaluate the individual news streams? Were they satisfied with the relevance of the articles in the individual news streams?

The results of the final survey show that DIAS respondents most liked the ‘recent’ (latest news) tab. Furthermore, the relevance of the articles in the ‘recent’ news stream was most positively evaluated of all three news tabs. We do put forward that most DIAS app respondents were extremely satisfied with the relevance of the articles in all three the individual news streams.

These results were confirmed by looking at the insights from the qualitative interviews. The interview respondents stated that they were satisfied with all three news streams in the app.



The qualitative data provided insight into why the ‘latest news’ stream was frequently used by the respondents in addition to the ‘my news’ stream. Namely, the interview respondents read the ‘latest news’ articles because they felt that the personalised news stream was not always up to date, to ensure that they did not miss out on important news, and when they wanted to read news articles that were different from their own interests.

To what extent did the respondents experience fear of missing out?

The results of the weekly surveys indicate that most DIAS app respondents somewhat agree that they would have missed something if they only read the personalised offer in the ‘my news’ tab. 50% of respondents feel neutral towards the statement that they experienced fear of missing important news while using the app. The results of the final survey confirm that most DIAS app respondents think they would experience fear of missing out when only consulting the ‘my news tab’. On the other hand, most respondents somewhat disagree that they fear to have missed important news while using the app.

We learnt from the qualitative interview data that the presence of two news streams in the CPN app, allowing the **consumption of ‘latest news’ in combination with a personalised offer in the ‘my news’ tab considerably reduced the respondents’ fear of missing out and enhanced their feeling of being fully informed.**

To what extent did the respondents experience a filter bubble?

The findings of the weekly surveys show that overall, the **DIAS app respondents did not have the impression that the articles that appeared in the ‘my news’ tab isolated them in their own cultural or ideological bubble.** This result was confirmed by the findings of the final survey. The qualitative interviews provided insight into why the DIAS app respondents did not perceive a filter bubble. The respondents actively searched for news articles that were different from their own interests in the other ‘latest news’ stream.

How did the respondents experience the news offer in terms of diversity, being surprised and fulfilment of their expectations?

The findings of the weekly surveys indicate that most DIAS app respondents somewhat disagree that the articles that appeared in the ‘my news’ tab were very diverse. Overall, 50% of the weekly survey respondents indicate that they were not surprised by the personalised news offer. Most respondents stated that the articles in the ‘my news’ tab surprised them sometimes. 50% of the respondents indicate that the personalised offer met their expectations about half of the time and the other 50% stated that their expectations were fulfilled most of the time. These results were largely confirmed by the findings of the final survey.

Although the user surveys suggest that the personalised offer largely met the expectations of the DIAS app respondents, we learnt from the qualitative interview data that **users were disappointed that the news offer in the CPN app was not similar or related to the news content that they expect on the SigmaLive website.** So, in this sense the content that was provided in the CPN app did not fulfil the expectations of the DIAS app users.



How did respondents experience the personalised news offer? To what extent are the respondents satisfied with the personalised news offer?

The weekly survey results indicate that most DIAS app respondents felt neutral towards the statement that the ‘my news’ tab contained a personalised offer for them. Most respondents were moderately satisfied with their personalised news offer. These results are largely confirmed by the findings of the final survey, with the difference that most respondents of the final survey were either somewhat satisfied or neither satisfied nor dissatisfied with the personal list of news articles in the ‘my news’ tab.

Considering the DIAS app respondents’ feedback on the personalised stream during the interviews, the user survey results might be explained due to the fact that some respondents felt that the articles in the ‘my news’ stream were outdated. Furthermore, some respondents emphasized that in their opinion the CPN-recommender was not working properly because they kept receiving articles about topics that they were not interested in despite the fact that they were not reading that kind of news i.e., sports news. Regardless of their experience of the personalised stream in the CPN app, the interview respondents emphasized that they need a personalised stream because this would enhance the time-efficiency of their news consumption and reduce the time spent on searching for interesting news.

To what extent are the respondents satisfied with the app in general? Would respondents like to use the app again in the future? Are they willing to recommend the app to others?

The findings of the final survey showed that most **DIAS app respondents are extremely satisfied with the CPN app in general**. Most respondents said that the app worked properly during the test. Furthermore, the respondents positively evaluate the user friendliness, ease of use, arrangement, and visual attractiveness of the CPN app. Most DIAS app respondents answered positively when asked if they would like to use the CPN app even further in the future. In addition, the respondents have a medium willingness to recommend the app to others.

Finally, we learnt from the qualitative interview data that **most users think that the CPN app could replace existing news sources** under certain circumstances. The respondents think that the CPN app could even replace their main news sources if the efficiency of the recommender is improved and the user interface becomes more interactive. For example, if it provides suggestions for related articles from different sites “to have a more spherical view”.



5 EVALUATION OF THE PRODUCER'S DASHBOARD BY PROFESSIONAL USERS

The producer's dashboard was tested and evaluated by professional users i.e., journalists and editors in all three pilot countries by means of individual interviews. The dashboard was evaluated in terms of usefulness, ease of use, and ease of learning.

5.1 METHODOLOGY

The feedback of the professional users was gathered by means of observation (think aloud method) and/or demonstration of the producer's dashboard and an interview via video conference call. VRT and DIAS applied the same method to evaluate the producer's dashboard. DW distributed a survey via Google forms instead of conducting interviews. We used pilot 3 data because this was the final release of the producer's dashboard. Before the interview, the interviewers asked the interviewees via email to fill in a 'drop-off'. This is a qualitative questionnaire that is composed of mainly open-ended questions to collect background information about the interviewees. The interviewers asked the interviewees to send the completed drop-off via email to the interviewers before the interview date. In addition to the drop-off, the interviewers also sent a 'CPN product board flyer' (appendix A) to the interviewees which contained information about the project goals and a description of the producer's app and the CPN-recommender.

On the day of the interview and before the testing procedure, the interviewers filled in a template to describe the date of interview, the location, name of the interviewer, name of the interviewee, and indicated if it was the first time that the interviewee used the producer's dashboard. The test-procedure duration was 30 minutes. Firstly, the interviewer briefly explained the project goals and described the product dashboard. The interviewer then gave a demonstration of the basic functionalities of the producer's dashboard. The duration of this demonstration was 5 minutes. The interviewer encouraged the interviewees to continuously 'think out loud', ask questions or say their thoughts while the interviewer was demonstrating the software.

After the demonstration, an interview with a duration of 25 minutes took place to inquire from the interviewees their experience and perceived usefulness of the dashboard for their work context. Firstly, the interview was composed of general questions to evaluate the general use of the dashboard. Secondly, the interview consisted of specific questions to explore the core feelings of the professional journalists towards news personalization technology. This made the interview more comprehensive and allowed the interviewer to go into depth about i.e., what normative issues the journalists are dealing with. Lastly, the interviewer asked a few round-up questions to complete the interview.

The interview protocol was originally formulated in English but the interviews were conducted in the 'mother tongue' of the pilot partner. Interviews with VRT journalists were conducted in Dutch, interviews at Deutsche Welle were conducted in German and English, and interviews with DIAS professionals were conducted in Greek. The interviewers translated the English interview protocol to the language that was used in the interview and created an



interview transcript in the same language. If the interview was not conducted in English, the interviewers created a summary of the interview transcripts in English for the data-analysis.

The table below shows the number of interviewees and interviewers per pilot country and media partner. The overview of the background profile of the interviewees is included in appendix B.

Table 18: Overview of the number of interviewees for the evaluation of the producer's dashboard per media partner and pilot country

Media organisation	Number of interviewees	Interviewer
VRT	3	Natasja Van Buggenhout (imec)
DW	7	Olga Kisselman (DW)
DIAS	5	External evaluation by Cyprus University

In addition to the interviews with professional journalists from the media partners, one interview was conducted with Al Ramich, the founder and CEO of Loomi.

5.2 EVALUATION BY MEDIA COMPANIES IN THE CPN CONSORTIUM

5.2.1 VRT

Evaluation of the dashboard elements and use

The table below shows the most pertinent comments and questions about the individual elements of the producer's dashboard that were noted during the interviews with professional journalists from the Flemish public broadcaster, VRT.

Table 19: Evaluation of the dashboard elements and use by VRT journalists

Element	Questions and comments
<i>Dashboard</i>	How do the 'likes' work? What is the meaning of the colours in the donut charts?
<i>Articles</i>	What are the possibilities for sharing articles on social media and for liking articles in the app?



<i>Recommender</i>	How to use the insights / how to integrate these into professional activities?
<i>Topics</i>	To what extent is there an overlap between ‘tags’ and ‘trending topics’? The most common topics are present but it is suggested to also include lower/more specific topic categories.
<i>Overall</i>	It is difficult to evaluate user friendliness during a demonstration.

Evaluation of the dashboard in general

The VRT journalists pointed out that the dashboard is not visually appealing but it is simple, clear and the essential information is present. The interviewees mentioned that the dashboard looks easy to use. They think that it is useful i.e., to show what has been most read, what emerges from/is offered by the algorithm and works well, and to analyse what articles or topics to highlight more than others. The only adjustment that is proposed by the VRT journalists is to add specific ‘tags’ i.e., ‘Coronavirus’ or ‘Brexit’ to the articles in addition to the broad topic categories that are already present. Elements that are missing according to the VRT journalists are the number of people present in the app, and a dynamic/visual representation of when articles are trending or declining. Opinions differ when asked if and how they would integrate the producer’s dashboard in their professional workflow. Only one VRT journalist gives a positive answer. He thinks the dashboard would be useful to be inspired and know which topics are popular, what people are interested in, or see what things have been inadequately exposed. The other two VRT journalists answered negatively and would not integrate the producer’s dashboard into their professional workflow because there are already a lot of tools being used in the newsroom, they think that the editors would have many questions about it, and they emphasize that they would first need to use the dashboard to see what it yields.

Interpretation of the dashboard and effects on news work

The VRT journalists positively evaluated the input data of the CPN-software. Firstly, they pointed out that collaborative filtering is very important data because “people are always curious about what other people are doing”. Consequently, it is relevant if you have missed certain articles in the app and they are offered this way. Secondly, the VRT journalists think that content-based filtering is crucial data because it is important to offer other articles that are in line with the theme of the article to end users and it is useful for filtering information overload. The VRT journalist would not remove any of the aforementioned input data. Instead, they recommend also adding click behaviour as input data for the CPN-software.

When asked if they use other dashboard or metrics in their organisation, the VRT journalists mention that they frequently use SmartOcto, Adobe, and Google Analytics. These tools are used to look in real time to what is being read and from what sources people come to a certain article. In addition, they analyse historical data to see what worked well and what didn’t. Furthermore, data analytics are used to determine if articles should get a more prominent place on the VRT website or social media channels.



Editorial practices and transparency

We evaluated the professional users' attitude towards news personalisation and its impact on their editorial practices i.e., by inquiring from the interviewees what is their opinion on the existence of filter bubbles. All three VRT journalists think that the filter bubble exists and is a problem. They pointed out that for example, end users today increasingly consume news via social media and this is a danger when people only consume news via other channels than through traditional news media. On the other hand, one of the VRT journalists emphasizes that social media provide a good picture of the entire society and are a wake-up call for journalists. "The reactions you read there are nine times out of ten not the reactions that you would expect in your own bubble (...) journalists can check for example, based on the reactions on social media, which themes are really alive or what people think about a certain subject and this is not always the way that we think." To prevent or burst filter bubbles, the VRT journalists suggest that news organisations should ensure that everyone receives a varied offer.

Lastly, the VRT journalists evaluated the personal data receipt i.e., to estimate if this approach will enhance the transparency towards end users in terms of data collection and processing. All VRT journalists agree that this is a very open and transparent approach. They think that the personal data receipt is useful to gain the end users' trust and boost their confidence. The VRT journalists evaluate the personal data receipt as an efficient way of communicating towards media users however, they fear that it will be too much information if it changes too often.

5.2.2 DW

Evaluation of the dashboard in general

Overall, interviewees at DW think that the producer's dashboard is visually appealing. They mentioned that the dashboard looks simple, clean and the basic features are present but some adjustments are necessary. The dashboard is now "too general to be functional". Firstly, the naming conventions and comparability of metrics need to be improved. In addition, it is advised to optimise the logic and depth of information since it is still "unclear what the dashboard (and underlying CPN) really wants".

The interviewees at DW all agree that the producer's dashboard is easy to use. They think the dashboard is straight-forward and that it has a clean design and structure. However, one respondent mentioned that they are missing labels, explanatory text and legend to truly understand the dashboard. Another respondent pointed out that the usage is not a problem but there are issues with the visualisations in the sense that "they do not clearly indicate what the input is (how many users, articles, and what changed through personalisation)". Five of seven DW interviewees think that the producer's dashboard is useful i.e., for topical analysis, performance ranking, a quick overview on performance of articles in a given timeframe, as monitoring and screening tool, and to evaluate the CPN recommendation system in comparison to other recommendation and filter systems. Two of seven respondents however do not think the dashboard is useful for them at this stage and one of these respondents explains that they "need more insight, meaning finer grained information".



There are quite some dashboard elements that need to be revised according to the DW interviews. Firstly, one respondent remarked that “the dashboard must report whether the work leads to results - more engagement, happier users, etc. (...) There must be a strategy towards enrichment through personalisation. This - at least by looking at the dashboard - is unclear and should therefore be changed”. Another respondent added that it is important for journalists to know why people clicked on the article, how long they read, what their follow-up action was, if there is a relationship between the click rate and the headlines, and if this relationship differs between personalised and non-personalised content. Two of seven respondents commented on the scales of the best/worst performing articles i.e., “the recommender should use the same scale (high to low percentage) for ranking the best and worst performing content”. Currently, the scales are “misleading”. The respondents also pointed out that more detailed topical keywords should be added to the producer’s dashboard. “The trending topics section should feature actual topics, not extremely broad (and relatively useless) categories”. Lastly, it was mentioned that the colour coding needs more clarity.

The DW interviewees also think that some elements are missing from the dashboard. Firstly, the respondents mentioned that a strategy is needed “to answer the why questions” i.e., to explain why personalisation leads to more/happier users, who get what they want - and how the newsroom using it benefits from this. Journalists need to be able to see the relationship between content and personalisation. Correspondingly, it is suggested to have a more refined grid of options/refinement elements and to add more fine-grained levels of prioritisation. “Not only “breaking news” but a whole range of other categories e.g., interview, explainer, short update, data, chart, map, short video, etc.” It would also be useful if the dashboard provided suggestions and help to the journalists i.e., to write the right headlines. Secondly, the DW interviewees mentioned that more explanations or a manual are needed i.e., to understand what each view does, what the metrics mean, what the trending topics are based on, what the context of the graphs is (labels, legends and introductory text), and to explain the colour coding of the pie charts in the dashboard tab.

If made available, five of seven DW interviewees indicate that they would like to use the dashboard for professional activities. In regard to their everyday work, the respondents mentioned that they would use it for the following purposes:

- A quick overview to see if potential changes are necessary to metadata/headlines of articles that are not performing well;
- Discover missing topics or adjust output;
- Analyse content performance and create/commission more attractive articles;
- Tag/inject certain articles into certain timelines/feeds;
- Combine functions of the analysis of the best performing and less performing analysis with topical analysis;
- Monitoring of the specific topics and measuring the performance of the items.

Two of seven DW interviewees would not integrate the dashboard with their normal workflow. The first respondent mentioned that they are not in a position to have influence on



selecting or recommending the CPN recommenders in their organization. The second respondent emphasized that the dashboard in its current form is not informative enough. “A dashboard, to be useful, must at all times indicate whether decisions in the past lead to a higher engagement and what should be done next. E.g., sent out specific information at certain times of the day, based on user preferences and how this leads to rising or constant engagement. Even “shortening engagement” could be a goal here, in the sense of trying to be the source which is the best to get a brief update with the least amount of time.”

Interpretation of the dashboard and effects on news work

All of the interviewed journalists at DW indicated that the dashboard provided too little information to be able to evaluate the input data for the CPN-system, collaborative filtering and content-based filtering. One respondent mentioned that the input data are “not transparent”. Another respondent explained that “this is unclear, a section helping to understand the generation of the data is missing.” Correspondingly, the DW respondents pointed out that the dashboard provides too little input to evaluate if any parameters should be removed. One respondent mentioned metrics that could be added to the dashboard. These input data would be the number of daily active users (DAU), insights in the results of a control group for comparison, the number of published articles and engagement (reading time), insights into user behaviour such as sharing the article on social media or tweeting about it. “In short, a clear picture of data points helping an editor to understand where the journey started and where it is heading (from the perspective of the newsroom/editor).”

When asked if they use another type of dashboard in their everyday work to personalise news content, only one respondent replied positively. This interviewee indicates that they use many dashboards and “the ones that are important show how a situation evolves in terms of key metrics - number of users, advertising, both quantitative and qualitative.” On the other hand, all of the interviewees at DW confirm that they use data analytics, statistics or metrics in their organisation. The respondents use data analytics for the following purposes:

- Analysis of social media;
- Market and audience insights: audience development, user statistics, market and user research;
- Identification of news highlights: to find trending topics in dedicated regions;
- Monitoring the competition;
- Performance statistics: for measuring the performance and benchmarking;
- Tracking performance of different content (text, video, social media, etc.);
- Monitoring media output;
- Entity extraction for gisting and news overviews;
- Decision-making on information hierarchy and efforts spent on target audience touch points.



Editorial practices and transparency

All of the interviewees at DW believe that the filter bubble in journalism exists and is a problem. This issue “should be balanced out”. One respondent pointed out that filter bubbles are made by the users as much as by media offerings. For example, “some people do live in a filter bubble (like the almost classic right wing echo chamber that denounces all quality media as “Lügenpresse”), and many media organisations create some sort of restricted info sphere by choosing to ignore certain issues or focusing on all-too-mainstream opinions”. One respondent thinks that filter bubbles are mainly a problem for profit-oriented media companies. Furthermore, another respondent mentioned that recommenders contribute to it but can also be a solution for the issue. Considering other potential solutions for solving or bursting filter bubbles, respondents put forward that “algorithms that diminish the effect of the bubble are needed to mitigate the problem” and they highlight the importance of the diversity of news content and sources. “It is therefore important to always show or generate easy access to other perspectives.”

Correspondingly, we inquired from the DW interviewees if media and news organisations should inform their media users about the criteria that are used to personalise and recommend news content. Only one of seven DW respondents answered “no”. Six of seven DW respondents do think that it is important to inform media users about the criteria that are used for news personalisation. The respondents suggested that an explanation in a fairly general way should suffice but it should be presented in an easy to understand manner. “If the user wants to know more she/he should be able to request and receive the information easily.” When asked how media and news organisations can inform media users about this, respondents indicate i.e., that this explanation can be provided in the format of a blog post or “in an email sent out automatically after users opted in for personalised news services”.

5.2.3 DIASEvaluation of the dashboard elements and use

Most DIAS professionals found the dashboard interesting and wanted to know more about how to use it and what it has to offer. The interviewees positively evaluated the simplicity and found it easy to navigate through the dashboard. They thought the dashboard was useful but some elements need improve i.e., data analytics.

The table below shows the questions and comments of the DIAS interviews in regard to the individual producer’s dashboard elements.

Table 20: Evaluation of the dashboard elements by DIAS professionals

Elements	Questions and comments
<i>Dashboard</i>	What period are these numbers/data for?



<i>Articles</i>	<p>Are these truly the least popular/less performing news articles? Most professionals were surprised.</p> <p>One professional repeatedly tried to see the graphs of specific articles by clicking on the titles of the articles to see their performance.</p> <p>Some interviewees asked questions about the article dates.</p>
<i>Recommender</i>	How was the news included in the program selected?

Technical issues during the evaluation

There were some issues with the ‘Articles’-tab of the producer’s dashboard during the evaluation. The tables and graphs did not display any data when specific news articles were selected. In addition, if the interviewees selected a specific article to see more data and then tried to return to the previous page, they were directed to the homepage (‘Dashboard’) instead of the ‘Articles’-tab. The DIAS professionals were very annoyed by this problem.

Evaluation of the dashboard in the general

All professionals described the dashboard as interesting, easy to use, and very useful. Two of them were very intrigued by the “less performing articles” category.

The interviewees positively evaluated the usefulness of the dashboard for their jobs. It helps professionals to realize which news articles are the most read. Consequently, they better understand the preferences of their target audience. One DIAS professional compared the CPN-dashboard with other platforms and said it was better since it categorizes the users’ preferences. He emphasized that “It is always good to see which article has gotten better results, this can be done daily rather than on a weekly or monthly basis”.

When asked what could be changed to the dashboard, most professionals replied “nothing”. One interviewee however suggested adding an extra feature on the main page of the dashboard such as the ability to separate news categories from the articles underneath it. This additional feature should also indicate the timing i.e., at which hours of the day there are more active readers. Furthermore, it would be interesting to see the readability of our site per hour.

If made available, all five DIAS interviewees would integrate the dashboard in their professional activities. Some professionals mentioned that they would use it after working hours as well. For example, the dashboard would be useful in their everyday work:

- To see what items do or don’t interest the readers on a particular day and especially, on the days when the professionals notice that they do not have many readers. They would use this information to decide what topics to write on in the upcoming days;



- To view the less performing/read articles.

Interpretation of the dashboard and the effects on news work

Most DIAS professionals positively evaluated the CPN input-data, collaborative filtering and content-based filtering. One interviewee pointed out that it would be useful if the dashboard showed “trending keywords”. When asked if they would add other parameters, the professionals suggested:

- An option for readers to receive random news in addition to news that is related to their interests;
- The ability to select which news is distributed to readers on certain days i.e., news should be from Cyprus on working days but during weekends and holidays the readers might want to read international news.

Four of five DIAS interviewees currently use other software at work to personalize news content such as Google Analytics or Facebook. When asked how the CPN-dashboard is different from the tools that they currently use, the interviewees explained that Google Analytics can be quite complicated and that the CPN-dashboard provides a clear and easy way to view the data.

In addition, all the DIAS professionals use data analysis, statistics and metrics in their organisation to monitor the performance of news articles. For example, to see how well their website and news articles are doing, and to increase their readers. One interviewee said “we do manually what CPN does automatically”.

Editorial practices and transparency

The DIAS professionals were asked if they worried about the “filter bubble” in journalism, or on the other hand, to what extent they think this phenomenon does not exist or is not a problem. Most interviewees are troubled by the possibility that personalisation might create “filter bubbles”. They find filtering in itself quite problematic because they fear that many news articles might get “lost”. One interviewee however remarked that “there are so many news articles out there that it would be impossible for someone to read them all anyway”. After all, two DIAS professionals indicated that they do not believe that “filter bubbles” are a problem since the readers will read what interests them and not what you “force upon” them.

Most interviewees think that media and news organizations should inform media users about the criteria they use to personalize news content through i.e., notifications, messages, and extra informative materials. Correspondingly, all interviewees positively evaluated the personal data receipt. One DIAS professional however pointed out that they think that media users will not read the receipt. Yet, all interviewees think that the personal data receipt enhances transparency towards the end users.



5.3 EVALUATION BY SMES: LOOMI

In addition to the interviews with professional journalists and editors from the media partners in the CPN consortium, we set-up one interview with one of the start-up companies that are developing innovative solutions for the CPN-project (also mentioned in deliverable D5.4 Final report on dissemination). We interviewed Al Roomich, founder and CEO of Loomi to evaluate the CPN producer's dashboard in general.

Firstly, the interviewee recommends to improve the producer's dashboard visually. They pointed out that the dashboard now looks static and it is suggested to "make it more modern". Secondly, the interviewee mentions that the dashboard is very article-based and suggests that "if you base it on specific keywords and tags, you can get a lot more granular. You have to break information down at entity level and add additional meta-information." They also emphasized that Loomi can improve the CPN recommendation engine by providing all this meta-information. Furthermore, the interviewee advises that the producer's dashboard would provide more value for professional users by adding "a recommendation engine for journalists". This would take the form of an extra layer of insights that serve business intelligence analysis integrated in the dashboard. "For the moment, all those tabs pretty much show you a quick summary of what has happened but without any value for going forward (...) if you add a layer on top of that, if you are able to say these are the best articles but these are other articles that should be recommended because of these results, that would give an insight to the journalists and the publisher."

Overall, Loomi positively evaluates the usefulness of the producer's dashboard. "I would definitely consider adding a dashboard type of thing similar to this as a transparency layer for our recommendation engine because what you just showed is valuable and especially if you can explain why those articles are trending on top." In addition, the interviewee thinks there is a good fit for integrating the Loomi ontology in the CPN producer's dashboard. "There is a match, on multiple angles I see a value (...) by us providing the datasets and APIs that can improve the recommendation engine but we can certainly specialize and we have done a lot of work visualizing the data in a very appealing way so I think that probably both on ways to optimize the dashboard but also to optimize the app for the users."

5.4 CONCLUSIONS

The CPN producer's dashboard was demonstrated to and evaluated by professional users in three media companies (CPN project partners) and by the SME Loomi. Overall, the professional users thought that the dashboard was interesting and they wanted to know more about how to use it, what it has to offer, and how to integrate the dashboard insights into their professional activities.

Firstly, the **ease of use** of the dashboard was positively evaluated. The professional users mentioned that it is simple, has a clean design and structure. All the essential features and information are present. The dashboard is therefore easy to navigate. Secondly, the dashboard was positively evaluated in terms of **usefulness**. For example, the professionals would use it for the following purposes (integration in everyday workflow):



- As performance monitoring and analysis platform to show what articles have been most read (content) or what topics are trending;
- See what articles work well (evaluation of the CPN-recommender and algorithms);
- Discover ‘missing’ content and adjust output accordingly;
- Topical analysis;
- Audience analysis tool to better understand the users’ preferences and interests;
- Insights in ‘less performing’ articles.

The opinions of the professionals were divided about whether or not the dashboard is **visually appealing**. Yet, it is recommended to make the dashboard more modern and less static by adding dynamic visualizations and graphs of e.g., trending and declining articles over a period of time. As suggested by Al Roomich (CEO and founder of Loomi), this is a point for improvement of the dashboard where further collaboration between the CPN-consortium and Loomi can prove even more valuable in the future since Loomi is experienced in visualising data in an appealing way.

Further elements of the dashboard that need to be improved are:

- Data analytics: logic and depth of information, more fine-grained insights and information i.e., the effect of personalisation on reads and reading time of the users;
- Naming conventions of the metrics;
- Meaning and clarity of the colour-coding, visualizations and graphs: adding a manual, introductory texts, a legend, labels and context;
- Topics: adding ‘lower’ and more specific categories and ‘tags’ e.g., coronavirus, Brexit, etc.;
- Insights into the ‘likes’ of the news articles and engagement on social media;
- Evaluation of the CPN-recommender: insights into criteria for news personalisation and news article recommendations;
- Difference between personalised and non-personalised content: insights into what changed through personalisation, why does personalisation lead to happier users, and how does the newsroom benefit from this;

What is currently missing in the producer’s dashboard?

- The number of people that are present in the CPN-app (active users and readers);
- A ‘recommendation engine for professional users’ that provides added-value through an extra layer of insights that serve business intelligence analysis and provides journalists with e.g., suggestions for article headlines;



- An extra feature on the homepage (‘Dashboard’ tab) to separate the news categories (‘Topics’) from the articles underneath it. This feature should also provide insights into timing for example, at what hours of the day readers are most active, and when articles are trending or declining in terms of popularity.

The professional users positively evaluated the CPN-recommender input data, collaborative filtering and content-based filtering are both “crucial” and should not be removed from the system. In addition, the interviewees suggested adding the following input data:

- Click behaviour;
- Number of daily active users (DAU);
- Insights into the difference of the personalised group and the control group;
- Number of published articles and the engagement i.e., reading time;
- User behaviour on social media for example, sharing the article or tweeting about it;
- Trending keywords.

We provided the technical partners of the CPN-project with the professional user feedback and insights of the producer’s dashboard evaluation. They will take these recommendations into consideration when developing the final iteration of the producer’s app.



6 PILOT 3 – OVERALL CONCLUSIONS

We can now draw some final conclusions about the results of Pilot 3 evaluation. The results were definitely a great improvement over Pilot 2. In most of the different scenarios there has been a sensible increment of articles consumed (+51% for DW users and +59% for DIAS-app users by using the CPN app). In the case of VRT app there is no evidence that users getting CPN recommendations consumed more articles than users in the other groups (but it is worth to remind that the setup was different); however in VRT case other good behaviours of the CPN recommender have been demonstrated: users in the hybrid CPN recommender group read more from the personalized stream, have received articles with the highest diversity in the recommendation lists (and consequently consumed more diversely) and the CPN platform recommends slightly more articles from long-tail distribution although if the simple content-based recommender is the most successful in getting such articles actually read. The introduction of CPN services in existing websites (like in the case of DIAS) shows clearly an interest of users towards the personalized news feed indicating a great potential for the integration of such services in pre-existing apps and websites. The average consumption of articles in the CPN feed was almost double of the average consumption of articles in the website. Furthermore, in the CPN feed, users were coming back with an average of 11,4 sessions per user, when the website users had an average of 5,0 sessions per user.

Analyses of the surveys show sometimes mixed results about the opinions of the users about feeling informed and getting the right personalized content; we can attribute this phenomenon to the fact the “informedness” is a highly subjective concept and that, since there are very high expectations on an automated system that could reduce our information overload, when the recommender does not give perfect results, users feel that the system is not working properly. We remind that our system is tuned also for ensuring a diversity of the content provided and to foster in some cases “serendipitous” discoveries of new types of content that are not perfectly aligned with user profile history but could help them to get out of their comfort zone or filter bubble.

Once again, therefore, we demonstrated that it is not possible, with a single recommender, to obtain an improvement on all the desired business metrics (increased consumption, informedness feeling, diversity of content, etc.). The only possible approach, for a publisher, would be to focus on specific business objectives/trade-offs and using a system that allows for testing different system configurations to achieve the desired results.

The CPN platform offers to publishers exactly the level of control needed to address this task: it allows to define recommenders based on different techniques, combining them into an hybrid recommender, selecting the kind of user events that need to be taken into account, to test different recommenders on portions of the user base via A/B testing services) and to inspect the results in order to select the most successful one according to their own objectives.



7 APPENDIX A: CPN PRODUCT BOARD FLYER



CPN project

The Content Personalisation Network (CPN) is working on building a new, trustworthy approach to personalise digital content. The CPN project takes up the challenge of developing a new approach to personalise the daily news offer, allowing both large and small media companies to better target their content to media consumers. Our aim is to innovate how content creators are able to structure content production, distribution and in-depth interaction with audiences.

Therefore, we developed a virtual open platform (with reference architecture) where on the one hand, media professionals are able to receive faster and more targeted cross-channel news and information distribution solutions, and on the other hand, users are able to experience more attractive and engaging news and information.

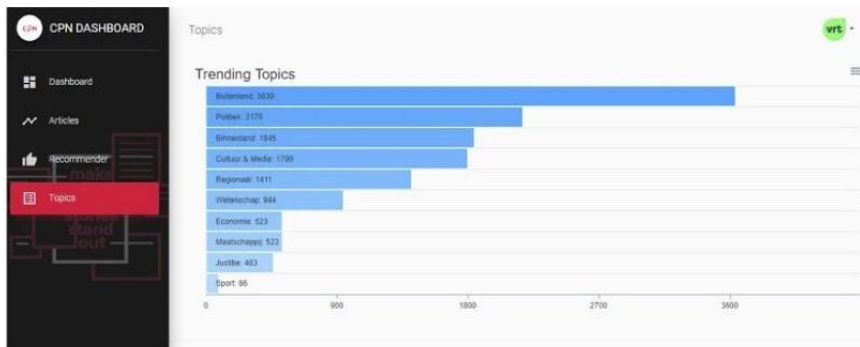
Throughout the duration of the project, we will iteratively test and validate the solution in real-life environments in different countries (Belgium, Germany, Cyprus and Italy) by setting up large scale pilots. Thanks to the feedback from our testers, end users and professional users, CPN will be able to improve and update the app and its recommendation software.

This project received funding from the European Union Horizon2020 research and innovation programme under grant agreement no. 761488.

Producer's app

The Producer's Dashboard UI provides analytics on the data collected, and allows for an easy integration into the producer's workflow. The prototype allows you to set an article as "breaking news". It also provides contract templates to allow freelancers to easily work together and with editors, to define and track the scope of individual contributions and to determine the expected revenues.





Screenshot of the CPN producers' dashboard UI

Recommender

The **CPN recommender system** is a core module that computes the most suitable news recommendations for CPN users. It analyses the users' profiles and collects news to find the most "interesting" news items to be proposed by the app.

This module is built with a hybrid approach that uses variable proportions of content-based and collaborative filtering techniques for learning from explicit and implicit feedback given by the users themselves: clicks, ratings, sharing, etc. The system is customizable for including content-delivery strategies' optimization: multichannel and date/time optimization (predicting the probability of interests at a given time on a given channel) and includes mechanisms for fostering "serendipitous" discoveries.

We provide an overview of the **input data** that the CPN software uses to personalise news content below:

- **Collaborative filtering:** a method of making predictions (filtering) about the interests of a user by collecting preferences or taste information from many users (collaborating) i.e., click and usage data (who reads which article and when).
- **Content-based filtering:** recommends the items based on a comparison between the content of the items and a user profile. The content of each item is represented as a set of descriptors or terms, typically the words that occur in a document, or higher-level representations. The user profile is represented with the same terms and built up by analyzing the content of items which have been seen by the user.

Project partners



8 APPENDIX B: BACKGROUND PROFILE OF THE PRODUCER'S DASHBOARD EVALUATION INTERVIEWEES (PROFESSIONAL USERS)

Media partner	Age, Gender, Nationality	Professional activity	Experience with news personalisation	Use of data analytics, metrics and statistics	Familiar with the CPN project?
VRT	46, Female, Belgian	Journalist	Little experience i.e., “my news” at BBC	Yes	Yes
	38, Female, Belgian	Audience engagement & analytics for VRT NWS	Limited experience	Yes	Yes
	34, Male, Belgian	Journalist	Little experience i.e., Facebook news targeting tools	Yes	No
DW	42, Male, German	Innovation manager	Following professional discussions on personalisation and knowledge of some approaches and tools, but no expert knowledge	Yes	Yes
	54, Male, German	Innovation Manager, Project Manager for Software	Basic technical knowledge, extended knowledge of business concepts and trials towards personalization	Yes	Yes
	29, Female, German	Project Manager	Low-medium, experience is mostly based on the expertise shared by colleagues working in CPN	Yes	Yes
	36, Female, Russian	Engagement Editor, Data	Basic	Yes	Yes



		Analyst			
	Age not indicated, Male, German	Innovation Manager	Basic to medium	Yes	Yes



9 APPENDIX C: VRT MYNWS WEEKLY QUIZZES

Quiz 1

7-14/02/2020

Hoe heet de storm die ons land afgelopen week teisterde?

- Sienna
- Ciara
- Laura
- Teresa

Aan welk orgaan werd rockzanger Arno geopereerd wegens kanker?

- Long
- Lever
- Pancreas
- Dikke darm

Wie nam op vrijdag 14 februari ontslag als huidige koninklijke opdrachtgever in de vorming van de federale regering?

- Sophie Wilmès
- Koen Geens
- Johan Vande Lanotte
- Jean-Luc Crucke

Waarom zijn niet alle frisdranken van Coca-Cola beschikbaar in de rekken van Colruyt?

- Risico op voedselvergiftiging
- Schending van de rechten van de arbeiders bij de productie
- Tekort bij de leverancier
- Prijsstijgingen



Uit welk land komt de regisseur van "Parasite", die de deze week de Oscartrofee voor beste film won?

- VS
- Frankrijk
- Palestina
- Zuid-Korea

In welke Amerikaanse staat won Bernie Sanders de Democratische voorverkiezingen?

- New Hampshire
- Pennsylvania
- Massachusetts
- Connecticut

Op zaterdag 8 februari maakte het Coronavirus officieel meer slachtoffers dan SARS in 2002-2003. Welk getal ligt het dicht bij het aantal doden dat daarvoor nodig was?

- 500
- 1000
- 5000
- 10000

Voor welke problemen mag je noodnummer 1733 op dit moment bellen?

- Bij brand, een ernstig ongeval met gewonden of dringende hulp van medische aard
- Bij een ernstig ongeval met gewonden, bij een verdachte situatie, als je getuige of slachtoffer bent van een inbraak
- Bij niet-dringende zaken waarbij je de hulp van de brandweer nodig hebt, maar waarbij niemand in levensgevaar is, zoals storm- of waterschade
- Als je 's nachts, tijdens de weekends en op feestdagen een huisarts met wachtdienst nodig hebt

Welke bedrijven zullen samen de "Vlaamse Netflix" oprichten in het najaar?

- VRT en DPG Media (VTM en Q2)



- Telenet en DPG Media (VTM en Q2)
- Proximus en Telenet
- Proximus en VRT

Met welke stad zal de nieuwe, peperdure hogesnelheidstrein High Speed 2 Londen verbinden?

- Bristol
- Birmingham
- Brighton
- Bath

Quiz 2

17-24/02/2020

9 52466 <https://www.vrt.be/vrtnws/nl/2020/02/17/hoe-erg-was-storm-dennis/>

Uit welke provincie kreeg 1722 de meeste noodoproepen voor de storm Dennis?

- West-Vlaanderen
- Oost-Vlaanderen
- Antwerpen
- Vlaams-Brabant

12 39547 <https://www.vrt.be/vrtnws/nl/2020/02/20/minstens-8-doden-bij-schietpartijen-in-duitse-hanau/>

In welke Duitse stad vielen minstens acht doden bij een schietpartij?

- Hessen
- Hanau
- Hamburg
- Halle

13 39235 <https://www.vrt.be/vrtnws/nl/2020/02/20/de-nieuwe-miss-germany-is-een-35-jarige-moeder-kan-dat-ook-in-b/>

Hoe oud is de nieuwe Miss Germany?

- 20



- 25
- 30
- 35

14 38592 <https://www.vrt.be/vrtnws/nl/2020/02/18/lage-emissiezones-opheffen-of-uitbreiden/>

Wat is er zo speciaal aan de lage-emissiezone van Rotterdam?

- Ze wordt afgeschaft
- Ze wordt de strengste van Europa
- Er is een uitzondering voor de wagens van bejaarden
- Je kan ze afkopen voor 2000 Euro per jaar

15 37680 <https://www.vrt.be/vrtnws/nl/2020/02/17/ultima-s-winnaars-2019/>

Tijdens welk evenement werd Jan Jambon met tomaten bekogeld?

- Ministerraad
- Ultimas
- Carnaval Aalst
- Uitreiking cultuursubsidies

31 29915 <https://www.vrt.be/vrtnws/nl/2020/02/20/30-bedrijfsleiders-schrijven-open-brief-wij-willen-geen-nieuwe/>

Wat willen de 30 bedrijfsleiders die afgelopen week een open brief aan de politiek schreven?

- Minder besparingen in het onderwijs
- Verlaging van de bedrijfsvoorheffing
- Zo snel mogelijk nieuwe verkiezingen
- Geen nieuwe verkiezingen

101 13436 <https://www.vrt.be/vrtnws/nl/2020/02/17/release-me-hooverphonic-reactie/>

Wie zal België dit jaar vertegenwoordigen op het Songfestival in Rotterdam?

- Hooverphonic



- Sobral
- Blanche
- Arno

102 13287 <https://www.vrt.be/vrtnws/nl/2020/02/17/woestijnsprinkhanen-blijven-terroriseren/>

Welke dieren vreten massaal de oogsten op in Oost-Afrika, waardoor de VN internationale hulp vragen?

- Coloradokevers
- Rupsen
- Sprinkhanen
- Motten

105 12939 <https://www.vrt.be/vrtnws/nl/2020/02/21/kristof-calvo-groen-het-is-de-vivaldi-piste-proberen-of-het/>

Wat is een Vivaldi-coalitie?

- Socialisten, liberalen, groenen en christendemocraten
- Liberalen, groenen en christendemocraten en N-VA
- Liberalen, groenen, christendemocraten en N-VA
- Socialisten, liberalen en christendemocraten

106 12701 <https://www.vrt.be/vrtnws/nl/2020/02/17/vrt-directiecollege/>

Van welke VRT-topman werd op 17 februari aangekondigd dat hij het bedrijf zal verlaten?

- Leo Hellemans
- Paul Lembrechts
- Peter Claes
- Luc Van den Brande

Quiz 3

24/02-01/03/2020



28 34382 <https://www.vrt.be/vrtnws/nl/2020/02/25/waarom-hadden-we-drie-stormen-na-elkaar-en-waarom-blijft-het-z/>

Welke van de onderstaande fenomenen is zeker een oorzaak van de vele stormen van de afgelopen weken in ons land?

- De straalstroom
- De klimaatopwarming
- Extreme sneeuwval in Siberië
- Afsmelten van poolijs

30 33359 <https://www.vrt.be/vrtnws/nl/2020/02/26/twitter-n-va-open-vld/>

Van welke partij neemt Gwendolyn Rutten af als voorzitter?

- N-VA
- OpenVLD
- Vlaams Belang
- CD&V

43 29287 <https://www.vrt.be/vrtnws/nl/2020/02/25/elektronicabedrijf-coolblue-verhoogt-plots-prijzen/>

De plotse prijsstijgingen bij internetwinkel Coolblue komen door toeleveringsproblemen bij sommige leveranciers. Wat is daar de belangrijkste oorzaak van?

- Het coronavirus
- De aanhoudende ruzie tussen Apple en Samsung
- De handelsoorlog tussen de VS en China
- Stakingen in de transportbedrijven

44 29132 <https://www.vrt.be/vrtnws/nl/2020/02/24/belgisch-kampioen-duurlopen-legt-bijna-210-kilometer-af-op-24-uu/>

Adinda Vetsuypens (37) uit Kruisem werd Belgisch kampioen ultralopen. Ze legde 208,76 kilometer af in 24 uur. Wat klopt niet over deze impressionante dame?

- Ze is eerder al Miss Metal geweest
- Ze is lerares godsdienst



- Ze heeft een man en kinderen
- Ze is transgender

75 18581 <https://www.vrt.be/vrtnws/nl/2020/02/24/harvey-weinstein-schuldig-aan-seksueel-geweld-en-verkrachting/>

Hoeveel jaar gevangenisstraf riskeert de Amerikaanse filmproducent Harvey Weinstein nu de jury hem schuldig bevonden heeft aan seksuele aanranding en verkrachting.

- 5
- 10
- 25
- Levenslang

96 14996 <https://www.vrt.be/vrtnws/nl/2020/02/26/democraten-nieuw-debat/>

Wat gebeurt er op Super Tuesday?

- De finale van het American football wordt gespeeld
- 14 Amerikaanse staten houden voorverkiezingen
- Extreme kortingen in de winkels in de VS
- Een van de belangrijkste luchtslagen uit WO II wordt herdacht

99 14925 <https://www.vrt.be/vrtnws/nl/2020/02/24/vlaamse-overheid-vrijwillige-ontslagen/>

Waarom nemen steeds meer ambtenaren ontslag bij de Vlaamse overheid, volgens Tom Ongena (Open VLD), het parlementslid dat de cijfers opvroeg.

- Teveel gevallen van pesten op het werk
- Ze krijgen een beter aanbod uit de privésector
- Gebrekkige infrastructuur
- Te weinig opleidingsmogelijkheden

107 13349 <https://www.vrt.be/vrtnws/nl/2020/02/25/minister-van-staat-en-oud-burgemeester-jaak-gabriels-van-bree-do/>

Op grond van welke beschuldigingen werd minister van staat en oud-burgemeester Jaak Gabriëls van Bree doorverwezen naar de correctionele rechtbank?

- Belastingontduiking



- Bendevorming, schriftvervalsing en misbruik van vertrouwen als persoon in een openbaar ambt
- Opzettelijke slagen en verwondingen aan een minderjarige
- Diefstal en verduistering van overheidsmiddelen

112 12361 <https://www.vrt.be/vrtnws/nl/2020/02/21/acteurs-van-friends-zetten-licht-op-groen-voor-reunie/>

In welk jaar werd de laatste aflevering van de sitcom Friends ingeblikt?

- 1998
- 2000
- 2002
- 2004

137 9170 <https://www.vrt.be/vrtnws/nl/2020/02/22/bisdom-gent-verwacht-veel-van-monnik-bisschop-lode-wie-is-hij/>

Uit welke abdij komt Lode Van Hecke, de nieuwe bisschop van Gent?

- Westvleteren
- Orval
- Westmalle
- Chimay

53 24856 <https://www.vrt.be/vrtnws/nl/2020/02/22/bedenker-van-lego-poppetjes-is-overleden-hij-laet-8-miljard-pl/>

Uit welk land komt de onlangs overleden bedenker van de Lego-poppetjes?

- Duitsland
- Zweden
- Denemarken
- Nederland

Quiz 4

02/03-11/03/2020



9 84005 <https://www.vrt.be/vrtnws/nl/2020/03/07/advocaat-sven-mary-ik-neem-geen-vrouwen-meer-aan-op-mijn-kanto/>

Welke bekende advocaat vertelde in een interview met Het Laatste Nieuws dat zijn kantoor geen vrouwelijke advocates meer in dienst neemt na een slechte ervaring.

- Jef Vermassen
- Sven Mary
- Kris Luyckx
- Paul Quiryne

36 34141 <https://www.vrt.be/vrtnws/nl/2020/03/10/de-helft-van-de-wetenschappelijke-raad-van-kazerne-dossin-neemt/>

Van welk museum nam de helft van de achttien leden van de wetenschappelijke raad op 9 maart ontslag?

- BOZAR
- Train World
- Kazerne Dossin
- Design Museum Gent

38 32892 <https://www.vrt.be/vrtnws/nl/2020/03/06/auto-vernielt-standbeeld-op-paaseiland-een-aanval-op-onze-cult/>

Hoe geraakte één van de beroemde standbeelden op Paaseiland afgelopen week verwoest?

- Grafitti
- Aardverschuiving
- Diefstal van losgekapt stukken
- Er reed een wagen tegen

43 28706 <https://www.vrt.be/vrtnws/nl/2020/03/07/seriemoordenaar-michel-fourniret-bekent-nieuwe-moord-op-meisje/>

Welke misdaad bekende seriemoordenaar Michel Fourniret?

- Belastingontduiking
- Ontvoering



- De moord op een meisje van 9
- Meineed

47 26257 <https://www.vrt.be/vrtnws/nl/2020/03/06/uitvoering-doodstraf-nathaniel-woods-eerst-opgeschort-door-ameri/>

De 43-jarige Nathaniel Woods werd in Alabama geëxecuteerd worden voor betrokkenheid bij de moord op drie politieagenten in 2004. Wat was er speciaal aan de executie?

- Ze werd uitgevoerd met de kogel
- Ze werd op enkele uren tijd eerst opgeschort en dan alsnog uitgevoerd
- Ze werd uitgevoerd door vrijwilligers
- Ze werd uitgevoerd door robots die vanop 2000 mijl afstand werden bestuurd

48 26138 <https://www.vrt.be/vrtnws/nl/2020/03/07/libanon-is-bankroet-wanbeleid-corruptie-en-touwtrekken-tussen/>

Hoe groot is de schuld die Libanon volgens premier Hassan Diab maandag niet zal kunnen betalen?

- 120 miljoen dollar
- 1,2 miljard dollar
- 12 miljard dollar
- 120 miljard dollar

16 55374 <https://www.vrt.be/vrtnws/nl/2020/03/08/italie-noodmaatregelen/>

Welke Italiaanse regio ging zondag in quarantaine om de verspreiding van het Coronavirus tegen te gaan?

- Ligurië
- Puglia
- Lombardije
- Lazio

60 21940 <https://www.vrt.be/vrtnws/nl/2020/03/05/wat-is-verkrachting-wat-is-het-verschil-met-aanranding-en-hoev/>



Waarin verschilt verkrachting van aanranding?

- Het slachtoffer geeft duidelijk aan niet toe te stemmen
- Er is seksuele penetratie
- Het gebeurt met de penis
- Er komt fysiek geweld bij kijken

13 62520 <https://www.vrt.be/vrtnws/nl/2020/03/10/gele-brooddoos-in-koelkast-kan-levens-redden-hulpverleners-besp/>

Waarvoor dient de gele brooddoos, die mensen uit Ledeberg kregen?

- Overschotjes die nog niet vervallen zijn
- Lege batterijen
- Medische informatie
- Zonnebrandolie

10 76309 <https://www.vrt.be/vrtnws/nl/2020/03/04/leen-demare-zoekt-job-na-ontslag/>

Bij welke radiozender werd Leen Demaré ontslagen?

- Radio 2
- JOE
- MNM
- Qmusic

