



PANDERAM

Development and Evaluation of Data-Based Personas

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Theoretical Background

Definition of personas [1] = fictitious users of a product or service

- Have specific needs, capabilities, and goals based on patterns in real-world audiences; at best, empirical data
- Typical form of presentation: profile
- Often several personas are created in order to meet the diversity of the group of users

Importance for the user-centered design process [2]:

- System developers should "empathize" with users and make design decisions based on this
 - Continuously supports user-centered thinking in the design process
 - Developments become more user-friendly



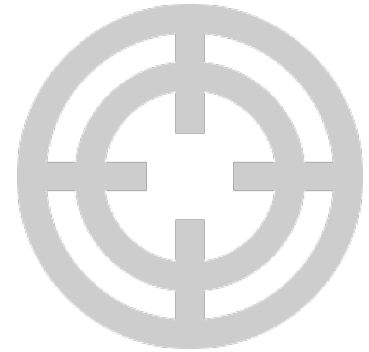


Aim of the Study

- Make data from previous two PANDERAM studies accessible for system design.
- Development and evaluation of data-based personas by system designers.

Research Question:

- How are the **personas** based on the PANDERAM user studies **evaluated by system designers**?
 - What are the opportunities for improvement for the personas? (explorative)
 - Are personas at the same behavioral level rated better than a persona at someone else's behavioral level?





Variables

- Independent variable (quasi-experimental):
 - Persona: Predecision vs. Postaction
 - Behavioral level [3] evaluator
- Dependent variables:
 - Persona assessment using Persona Perception Scale (PPS; [4]).
- Control variables:
 - KV 1: Experience with personas
 - KV 2: Frequency of use of personas





Organization

Timing

- Concept: 10/2021 - 01/2022
- Implementation & testing in LimeSurvey (version 5.2.9): 01/2022
- **Start:** 01/10/21; **End:** 02/16/22

Recruitment

- Call in the professional environment of the TUC project managers
- PANDERAM project consortium
- Members of the German UPA

N=12 individuals successfully participated in the online study.





Procedure 1/2

- **Welcome**, description of the **aim and procedure of the study**, privacy policy and consent form.
- **Demographic information** (age, gender, highest level of education, occupation).
- Indication of **experience** with personas (if none, brief explanation), **frequency of use** of personas, and assessment of **usefulness for projects**.
- Request to **read** the Persona Profile 1 (randomized order) and **comment on** and **return** the pdf document.
- Evaluation Persona 1 by means of PPS [4].
- Request to **read** the Persona Profile 2 and **comment** and **return** the pdf document.
- Evaluation Persona 2 by means of PPS [4].
- Possibility for **general comments** on personas



Procedure 2/2

- **Behavioral level classification** according to Bamberg [3] based on 5 statements
- **Farewell** and possibility to contact

Average duration of survey: $M=43.91$ min ($SD=29.03$, Min=19.01 ; Max=87.34)





Material: Persona Peter Müller (Predecision)



SHORT PROFILE

Age: 22 years

Gender: male

Education: high school

Professional situation: student in the fourth semester

Peter is rather **less tech-savvy** and **has owned a Smartphone**. For him, it is more important to educate and support others in this area than to present his social superiority.

Source: PANDERAM user study; demographic variables (age, gender, education, occupation).

To enable distinctiveness of the personas, few variables (such as gender) were varied

Source: ATI-Scale [5] PANDERAM user study, smartphone usage time

Source: adapted SSBC behavioral level description [3] for Predecision behavioral level.

Source: PANDERAM user study; Self-Enhancement Value Scale [6].

"The exposure of my data worries me, however, I don't yet know how to better protect my data."



Material: Persona Peter Müller (Predecision)



Source: PANDERAM user study; smartphone use: (De-) installation behavior

Source: PANDERAM user study; smartphone competence adapted from [7].

Source: PANDERAM user study; Privacy Concerns [8].

ATTITUDE TO DATA PROTECTION AND PRIVACY

Peter has installed many apps, a quarter of which he uses regularly. He mainly uses Instagram, WhatsApp and Spotify. In contrast to Paloma (see Persona Paloma), Peter installs a smaller number of apps, which he does not access as often, but uses longer. Peter installs new apps because he needs the provided service or out of curiosity. He installs new apps more often than he uninstalls apps. Peter rates his competence with smartphones as rather average and rarely uses the option of restricting app permissions.

Nevertheless, it is important to him to protect his personal data. He shows concern about the security of his privacy and improper disclosure of his information. Peter has not yet set any goals for himself on how he wants to deal with the protection of his data in the future. He is also rather unaware that this is his personal responsibility.



Material: Persona Peter Müller (Predecision)



MEASURES TAKEN TO DATE TO PROTECT PRIVACY

Peter uses three ways to find out about the collection of his personal data by app providers and to restrict it: the settings menu of the smartphone, the privacy information within an app (T&Cs) or a search via a search engine. He finds these ways tedious and often does not find enough information about what exactly happens with his data. He is less aware that he can protect his privacy through his own behavior.

Source: PANDERAM follow-up study



Material: Persona Peter Müller (Predecision)



Source: Behavioral stage model according to Bamberg [3]

Source: PANDERAM follow-up study

Source: Behavioral stage model according to Bamberg [3].

DATA PROTECTION TOOL REQUIREMENTS

Peter wants to learn more about data protection and privacy and how he can protect himself and others in this regard. Peter needs a user-friendly tool that presents him with all the privacy information of the apps with little effort. It should show as transparently as possible what data is being collected from him and how this can be changed. If the apps do not meet his personal requirements (lack of options in the privacy settings), he wants the tool to recommend alternative apps.



Material: Persona Paloma Martin (Postaction)



SHORT PROFILE

Age: 24 years

Gender: female

Education: university degree

Status: employee

Paloma is rather tech-savvy and has owned a smartphone for 8 years. It is more important for her to support others than to present her own social superiority.

"I've already developed some methods to protect my data. I am interested in how effective these methods are and what I can still improve to protect my data."



Material: Persona Paloma Martin (Postaction)



ATTITUDE TO DATA PROTECTION AND PRIVACY

Paloma has installed many apps, a quarter of which she uses regularly. She regularly uses privacy-friendly information services such as Telegram or Signal. In contrast to Peter (see persona Peter), she uses more apps, which she calls up more frequently. Paloma installs new apps because she needs the provided service, through recommendations from acquaintances or out of curiosity. Paloma uninstalls as many apps as she installs. Recommendations from others also play a significantly larger role for installing apps than for Peter. Paloma rates her competence in dealing with smartphones and their apps rather highly and often restricts apps in their permissions.

Having control over the use of her data is very important to Paloma. Paloma often fears being digitally monitored and that her privacy could be at risk.



Material: Persona Paloma Martin (Postaction)



MEASURES TAKEN TO DATE TO PROTECT PRIVACY

To find out about and limit the collection of her personal data by app providers, Paloma uses three approaches: the settings menu of the smartphone, the app or a search via a search engine. She finds this approach cumbersome and often insufficient information can be found by her about what exactly is happening with her data. In addition to this approach, Paloma limits herself in disclosing information as well as her usage behavior.



Material: Persona Paloma Martin (Postaction)



DATA PROTECTION TOOL REQUIREMENTS

Paloma wants a user-friendly tool that presents her with all the apps' privacy information with minimal effort. It should show as transparently as possible how the individual data collection is constructed and how it can be customized. If the apps do not meet her personal requirements (lack of choices in the privacy settings), she would like the tool to recommend alternative apps to her.

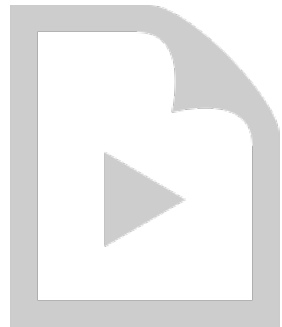
Since Paloma takes the protection of her data very seriously and actively implements it, she would like to learn whether her measures are sufficient or need improvement. She also hopes to stay motivated to maintain her behavior through feedback.



Results

Description of the Sample

- $N=12$ subjects
 - Average age 33 years ($M=33.08$; $SD=5.65$; $Min=26$; $Max=42$).
 - 6 males and 6 females
 - 11 out of 12 participants have a university degree
 - One third of the participants work in the IT branch, one quarter in the HMI sector
- 7 out of 12 participants report having theoretical and practical knowledge of personas.
- Of the participants who also use personas practically, 70% said they use them at least 1 time per month.
- Only one respondent assigned himself to the "Predecision" behavioral level
- 7 participants assigned themselves to the "Postaction" behavioral level

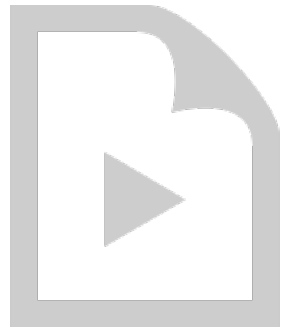




Results

Quantitative Data Analysis

- Reliability analysis (Cronbach's alpha)
 - PPS Predecision (total): $\alpha=0.94$ (= „*excellent*“; [9])
 - PPS Postaction (total): $\alpha=0.95$ (= „*excellent*“; [9])
- Test for normal distribution (Shapiro-Wilk test): normal distribution given
- A comparison between the behavioral levels is not possible because only one person assigns himself to the Predecision behavioral level.
- Experience in using personas has a "strong" positive correlation ($\rho = .73$) with the overall rating of personas.
- The frequency of use of personas has a "strong" positive correlation ($\rho = .82$) with the overall rating of the personas.





Results

Quantitative Data Analysis

Overall Persona Score (PPS; [4])

- The **overall ratings of both personas are marginally above the median value range** of the scale and do not deviate significantly from the median of the scale (4).
- Overall, there are **no significant differences in the ratings of the personas** "Postaction" ($M_{\text{post}}=4.43$; $SD_{\text{post}}=1.03$) and "Predecision" ($M_{\text{pred}}=4.12$; $SD_{\text{pred}}=0.90$)

| | Persona Predecision | | Persona Postaction | |
|-------------------|---------------------|-------------|--------------------|-------------|
| Dimension PPS | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| Consistency | 4,94 | 1,07 | 5,02 | 1,35 |
| Completeness | 4,00 | 1,32 | 4,31 | 1,23 |
| Readiness for use | 4,31 | 1,33 | 4,47 | 1,51 |
| Credibility | 4,20 | 1,54 | 4,70 | 1,67 |
| Comprehensibility | 4,47 | 1,03 | 4,69 | 0,94 |
| Similarity | 3,02 | 1,65 | 3,85 | 1,66 |
| Sympathy | 3,90 | 1,31 | 4,13 | 1,23 |
| Empathy | 4,17 | 0,92 | 4,05 | 1,01 |
| Total | 4,12 | 1,27 | 4,40 | 1,32 |



Results

Quantitative Data Analysis

Evaluation of the individual dimensions of the personas (PPS; [4]).

- The reliability of the dimensions *empathy* and *comprehensibility* was in the "poor" to "unacceptable" range [9] and could not be sufficiently improved by excluding individual items
 - Nevertheless, the subscales were not excluded from further analyses because the reliability of the scales was confirmed by the authors [4] with a large sample ($N=412$) and represent central constructs in the assessment of personas

| Dimension PPS | Persona Predecision | | | Persona Postaction | | |
|-------------------|---------------------|-------------|-------------|--------------------|-------------|-------------|
| | α | M | SD | α | M | SD |
| Consistency | 0,78 | 4,94 | 1,07 | 0,84 | 5,02 | 1,35 |
| Completeness | 0,90 | 4,00 | 1,32 | 0,90 | 4,31 | 1,23 |
| Readiness for use | 0,83 | 4,31 | 1,33 | 0,94 | 4,47 | 1,51 |
| Credibility | 0,86 | 4,20 | 1,54 | 0,89 | 4,70 | 1,67 |
| Comprehensibility | 0,63 | 4,47 | 1,03 | 0,49 | 4,69 | 0,94 |
| Similarity | 0,96 | 3,02 | 1,65 | 0,94 | 3,85 | 1,66 |
| Sympathy | 0,96 | 3,90 | 1,31 | 0,96 | 4,13 | 1,23 |
| Empathy | 0,35 | 4,17 | 0,92 | 0,57 | 4,05 | 1,01 |
| Total (MW) | 0,94 | 4,12 | 1,27 | 0,95 | 4,40 | 1,32 |



Results

Quantitative Data Analysis

- The ratings of the dimension *Consistency* of both personas ($M_{pred}=4.94$; $SD_{pred}=1.07$; $M_{post}=5.02$; $SD_{post}=1.35$) is above their respective overall ratings ($M_{pred}=4.12$; $SD_{pred}=0.90$; $M_{post}=4.43$; $SD_{post}=1.03$).
- The dimension *Similarity* ($MW_{pred}=3.02$; $SD_{pred}=1.65$; $MW_{post}=3.85$; $SD_{post}=1.66$) was rated most negatively and is below the persona Predecision's overall rating.

| Dimension PPS | Persona Predecision | | | Persona Postaction | | |
|-------------------|---------------------|-------------|-------------|--------------------|-------------|-------------|
| | α | M | SD | α | M | SD |
| Consistency | 0,78 | 4,94 | 1,07 | 0,84 | 5,02 | 1,35 |
| Completeness | 0,90 | 4,00 | 1,32 | 0,90 | 4,31 | 1,23 |
| Readiness for use | 0,83 | 4,31 | 1,33 | 0,94 | 4,47 | 1,51 |
| Credibility | 0,86 | 4,20 | 1,54 | 0,89 | 4,70 | 1,67 |
| Comprehensibility | 0,63 | 4,47 | 1,03 | 0,49 | 4,69 | 0,94 |
| Similarity | 0,96 | 3,02 | 1,65 | 0,94 | 3,85 | 1,66 |
| Sympathy | 0,96 | 3,90 | 1,31 | 0,96 | 4,13 | 1,23 |
| Empathy | 0,35 | 4,17 | 0,92 | 0,57 | 4,05 | 1,01 |
| Total (MW) | 0,94 | 4,12 | 1,27 | 0,95 | 4,40 | 1,32 |

*H0: The measured mean value does not deviate significantly from the mean value of the scale.



Results

Qualitative Data Analysis

- Evaluation of the personas regarding missing content, redundant / superfluous / misleading content, ambiguous content
- Content-analytical evaluation according to Mayring [10], paraphrasing and reduction of statements, absolute frequency of mentioning
 - In total, this resulted in over 60 comments per persona
 - Missing content: 12 information per persona; Redundant / redundant / misleading content: 8 information per persona, ambiguous content: 19 statements per persona
 - Main criticism:
 - **Discriminatory power** between the personas **too low** (6 mentions)
 - Personas are considered to be **less realistic** (5 mentions)
 - **Clarity** and key points (such as pains, gains, needs; 5 mentions).



Results

Qualitative Data Analysis

- Exemplary quotes:
 - Criticism of selectivity: *"The personas are quite similar: young, similar educational background, grew up with smartphones. It would be interesting to develop more personas from different education and income levels, other age groups, etc."*
 - Criticism of clarity: *"Basically, all important information is contained in the personas. However, there is a lot of text in the personas, which makes it a bit tedious in practice. Would rather tend towards bullet points instead of continuous text."*
 - Criticism of degree of realism: *"In line with my comments, I question overall whether the personas are based on real people or - as is unfortunately very often the case in practice - are more of a wishful thinking of the ideal customer."*



Summary

Quantitative Data Analysis

- Both experience and frequency of use of personas have a positive correlation with ratings of the personas, i.e., the **more experienced the system designers** were, **the more positive** their **ratings**.
- The overall ratings of both personas by means of PPS [4] are marginally above the mean value range, i.e., **both personas** are **rated as average by system developers**.
- **The two personas** for the "Predecision" and "Postaction" behavioral stages do not differ significantly in their ratings.
- The ratings of **consistency of** the two personas deviate positively from the overall mean, i.e., this dimension is seen as a relative **strength of the personas** by the system designers.
- The perceived **similarity of** the two personas to the system designers deviates negatively from the overall persona evaluation in the case of persona predecision, i.e., this **persona is perceived as dissimilar**.



Summary & Revisions

Qualitative Data Analysis


- The main criticism of the persona content was related to the **lack of selectivity, degree of realism, and clarity of** the personas.
- Therefore, the personas were revised as follows:
 - The discriminatory power was increased by amplifying the diversity (age, culture, etc.) deviating from the collected data
 - Addition of further (fictitious) detailed information to the personas to increase the degree of reality [11].
 - Visual elements were changed as well as text passages transformed into bullet points
- In addition, the noted:
 - Missing **content**: 12 information **added** per persona
 - Redundant / redundant / misleading **content**: 8 pieces of information per persona **removed**
 - Misunderstood **content**: 19 statements per persona revised and/or **elaborated on**



Revision Persona Predecision

The revised profile of the persona Peter is [here](#) available.

Persona: Peter Müller



KURZSTECKBRIEF

Alter: 22 Jahre
Geschlecht: männlich
Bildung: Gymnasium
Berufliche Situation: Student im vierten Semester

Peter ist eher weniger technikaffin und besitzt seit 6 Jahre Smartphone. Ihm ist es wichtiger andere in diesem Thema unterstützen als seine soziale Überlegenheit darzustellen.

„Die Preisgabe meiner Daten beunruhigt mich, jedoch weiß ich nicht, wie ich meine Daten besser schützen kann.“

EINSTELLUNG ZU DATENSCHUTZ UND PRIVATSPHÄRE

Peter hat viele Apps installiert, wovon er ein Viertel regelmäßig verwendet. Hauptsächlich Instagram, WhatsApp und Spotify. Peter installiert im Gegensatz zu Paloma (siehe Paloma) eine kleinere Anzahl an Apps, welche er nicht so häufig aufruft, dafür aber für neue Apps installiert Peter, da er den bereitgestellten Service benötigt oder aus Neugierde installiert häufiger neue Apps als dass er Apps deinstalliert. Peter schätzt seine Kontrolle über den Umgang mit Smartphones eher mittelmäßig ein und nimmt die Möglichkeit des Ein- und Ausdeinstallierens von Appberechtigungen selten wahr.

Dennoch ist es ihm wichtig seine persönlichen Daten zu schützen. Er zeigt Besorgnis über die Sicherheit seiner Privatsphäre und eine unsachgemäße Weitergabe seiner Informationen. Peter hat für sich selbst noch keine Ziele gesetzt, wie er zukünftig mit dem Schutz seiner Daten umgehen will. Auch, dass dies in seiner persönlichen Verantwortung liegt ist ihm eher unbekannt.

BISHERIGE MAßNAHMEN ZUM SCHUTZ DER PRIVATSPHÄRE


Um sich über die Erfassung seiner persönlichen Daten durch App-Anbieter zu informieren nutzt Peter drei Wege: das Einstellungsmenü des Smartphones, die Datenschutzhinweise innerhalb einer App (AGB) oder eine Recherche über eine Suchmaschine. Er findet diese Wege mühsam und häufig findet er nicht ausreichende Informationen, was genau mit seinen Daten passiert. Ihm ist weniger bewusst, dass er seine Privatsphäre durch sein eigenes Verhalten schützen kann.

ANFORDERUNGEN AN DATENSCHUTZ-TOOL

Peter wünscht sich, mehr über das Thema Datenschutz und Privatsphäre zu erfahren und sich selbst aber auch andere diesbezüglich schützen kann. Peter benötigt ein nützliches Tool, welches ihm aufwandsarm alle Datenschutzinformationen der Apps präsentiert und transparent wie möglich aufzeigt, welche Daten von ihm erfasst werden und wie diese weitergegeben werden können. Sollten die Apps nicht seinen persönlichen Anforderungen entsprechen (mangelnde Wahlmöglichkeiten in den Datenschutzeinstellungen), möchte er, dass es alternative Apps empfiehlt.

PANDERAM

Peter Predecision



SHORT PROFILE

Age: 22 years
Education: High School
Employment: Bachelor study in biology
Leisure activities: Boulderfing, playing guitar, cooking

Peter is rather less tech-savvy. Due to his education, he is forced and able to deal with technology. In his private life, he avoids spending a lot of time on the subject.

“I am worried about the exposure of my data; however, I do not yet know how to better protect my data.”

ATTITUDE TOWARDS DATA PROTECTION AND PRIVACY

Peter has an Android smartphone on which he has installed 70 apps. He mainly uses apps that are currently trending, such as Instagram, WhatsApp, and Spotify. He installs new apps because he needs the services provided or out of curiosity, although he is not sure how the providers use his data. Peter rarely uninstalls apps he no longer needs. He rates his competence in dealing with smartphones as rather moderate and rarely takes advantage of the option to restrict app permissions.

PRIVACY MEASURES TO DATE

Peter became aware of cross-platform information sharing the first time he saw personalized ads. Now, he feels mainly pressure from outside to make more of an effort to protect his privacy. Peter rarely informs himself about data protection. However, he is aware that he could use the setting menu of the smartphone, the privacy policy of the app provider or the internet. Peter finds these ways tedious and often does not receive sufficient or understandable information about what exactly happens with his data.

| MOTIVATION | OBSTACLES | TARGETS |
|--|--|---|
| Peter wants to protect his personal information and take more control over his data. | Peter finds it tedious to learn about protecting his data and identify initial action steps. | Peter wants to be more confident in (not) disclosing his information and taking control of protecting his data. |

TOOL REQUIREMENTS

- Offering more information about data protection and privacy
- Simple representation of data collection and forwarding by app providers
- Demonstrate customization options to meet individual data protection need
- Suggestions for app alternatives if the privacy requirement is not met by an app

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Revision Persona Postaction

The revised profile of the persona Paloma is [here](#) available.

Persona: Paloma Martin



KURZSTECKBRIEF

Alter: 24 Jahre
 Geschlecht: weiblich
 Bildung: Hochschulabschluss
 Status: Arbeitnehmerin

Paloma ist eher technikaffin und besitzt seit 8 Jahren ein Smartp. Ihr ist es wichtiger andere zu unterstützen als ihre eigene soziale Überlegenheit darzustellen.

„Ich habe schon einige Methoden entwickelt, um meine Daten zu schützen. Mich interessiert wie wirksam diese Methoden sind und ich noch verbessern kann, um meine Daten zu schützen.“

EINSTELLUNG ZU DATENSCHUTZ UND PRIVATSPHÄRE

Paloma hat sehr viele Apps installiert wovon sie ein Viertel regelmäßig nutzt. Datenschutzfreundliche Informationsdienste wie z.B. Telegram oder Signal nutzt sie regel im Gegensatz zu Peter (siehe Persona Peter) benutzt sie mehr Apps, welche sie häufiger Neue Apps installiert Paloma, da sie den bereitgestellten Service benötigt, durch Empfeh von Bekannten oder aus Neugier. Paloma deinstalliert so viele Apps, wie sie installiert. Ft Installieren von Apps spielen Empfehlungen von anderen ebenfalls eine deutlich größere als für Peter. Paloma schätzt ihre Kompetenz im Umgang mit Smartphones und deren Ap hoch ein und schränkt Apps in ihren Berechtigungen häufig ein.

Kontrolle über die Nutzung ihrer Daten zu haben, ist Paloma sehr wichtig. Paloma befür digital überwacht zu werden und, dass ihre Privatsphäre gefährdet sein könnte.

BISHERIGE MAßNAHMEN ZUM SCHUTZ DER PRIVATSPHÄRE

Um sich über die Erfassung ihrer persönlichen Daten durch App-Anbieter zu informieren diese zu beschränken nutzt Paloma drei Vorgehensweisen: das Einstellungsmenü des Smartphones, der App oder eine Recherche über eine Suchmaschine. Sie findet dieses Vorgehen mühsam und häufig können nicht ausreichend Informationen von ihr gefunden werden, was genau mit ihren Daten passiert. Zusätzlich zu diesem Vorgehen schränkt si Paloma selbst bei der Preisgabe von Informationen sowie ihrem Nutzungsverhalten ein.

ANFORDERUNGEN AN DATENSCHUTZ-TOOL

Paloma wünscht sich ein nutzerfreundliches Tool, welches ihr aufwandsam alle Datenschutzinformationen der Apps präsentiert. Es soll so transparent wie möglich aufze wie die individuelle Datenerfassung konstruiert ist und wie diese angepasst werden könn Sollten die Apps nicht ihren persönlichen Anforderungen entsprechen (mangelnde Wahlmöglichkeiten in den Datenschutzeinstellungen), möchte sie, dass das Tool ihr altern Apps empfiehlt. Da Paloma den Schutz ihrer Daten sehr ernst nimmt und aktiv umsetzt, v sie gern erfahren, ob ihre Maßnahmen ausreichen oder verbesserungswürdig sind. Ebenf erhofft sie sich durch Rückmeldung für das Aufrechterhalten ihres Verhaltens motiviert zu bleiben.

PANDERAM

Paloma Postaction



SHORT PROFILE

Age: 42 years
 Education: University degree
 Employment: Human resources manager in an IT-company
 Leisure activities: Volleyball, theater, digital drawing

Paloma is rather tech-savvy. She enjoys using digital technologies at work and in her free time.

„I have already developed some methods to protect my data. I'm interested in how effective these methods are and what else I can improve to protect my data.“

ATTITUDE TOWARDS DATA PROTECTION AND PRIVACY

Paloma uses an iPhone 8 on which she has installed 90 apps. She tries to use apps like Telegram or Signal, which she finds more privacy-friendly than other apps that are currently trending. She regularly receives suggestions from acquaintances to install new apps. Since she is tech-savvy, she likes to try them out. Paloma tries to regularly delete apps she no longer needs. She rates her competence in dealing with smartphones and their apps rather highly and often restricts apps in their permissions.

PRIVACY MEASURES TO DATE

As a human resources manager, Paloma regularly researches job applicants and is sometimes shocked by the information they reveal about themselves on the Internet. To find out about and limit the collection of her personal data by app providers, Paloma uses three approaches: the settings menu of the smartphone, the app, or an Internet search. In doing so, she primarily seeks out platforms that primarily deal with the topic. She finds this approach tedious and often insufficient. Information can be found by her about what exactly happens to her data. In addition to these methods, Paloma limits herself in disclosing information as well as her usage behavior. For example, she refrains from disclosing certain optional information such as her gender.

| | | |
|---|---|--|
| MOTIVATION | OBSTACLES | TARGETS |
| Having control over how her data is used is very important to Paloma. Paloma fears that her privacy could be at risk. | Paloma fears missing out on information and not doing enough to protect her data. | Paloma wants to validate her previous behavior and perceive further measures and information to protect her privacy. |

TOOL REQUIREMENTS

- Low-effort representation of data collection and forwarding by app providers
- Demonstrate customization options to meet individual data protection needs
- further information as required
- Suggestions for app alternatives if the privacy requirement is not met by an app
- Validation of their previous measures

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Further Outlook

From the revised personas, user scenarios are derived in the following, which should enable persona-based prototype development.

The developed prototypes are then evaluated on a user basis.

- A/B testing
 - Prototype A: based on a universal design
 - Prototype B: tailored-design based on the personas
 - Application of the Think-Aloud Method: Qualitative evaluation
 - Application of SBS: Quantitative evaluation
 - Hypothesis (H1): The prototype developed on the basis of personas will be evaluated by potential users as more user-friendly than the prototype not developed on the basis of personas.



Finally, the results are summarized and recommendations for action for the PANDERAM project are derived.



Thank you for your attention!

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