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Understanding user Engagement with Digital Assistance Technology

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Abstract: ***This study investigates the variables that affect users' engagement with digital assistant technologies (DATs). The study examines the critical elements influencing engagement, such as user expectations, needs, accuracy, ease of use, and personalization. A survey with 149 respondents—mostly young adults who frequently use DATs—was used to gather data. The analysis indicates that user satisfaction is positively impacted by DAT familiarity and the factors influencing their use. The study emphasizes how crucial it is to create accurate, individualized, and user - friendly DATs to increase user satisfaction and engagement. It also urges more investigation into the intricate interactions among variables that affect how users interact with DATs.***

Keywords: Digital assistant technologies, user engagement, user satisfaction, ease of use, accuracy, personalization

1. Introduction

Artificial intelligence (AI) - driven software programmers known as "digital assistance technologies" are capable of a wide range of functions, such as conversing, giving information, and responding to queries.

They are becoming more and more common in both personal and professional contexts for tasks like sending text messages, making phone calls, playing music, and operating smart home appliances. A few of the well - known techs are Microsoft Cortana, Samsung Bixby, Huawei Assistant, Apple Siri, Google Assistant, and Amazon Alexa. These technologies can be incorporated into other software programmers and are accessible on a range of devices.

They have the power to transform how people interact with computers and offer individualized assistance in several contexts. The degree of interaction between users and digital assistants is referred to as user engagement with digital assistance technologies. User needs and expectations, ease of use, accuracy and dependability, and personalization are factors that affect user engagement. Accurate information should be provided by digital assistants that are simple to use and comprehend. By discovering user preferences, personalization can increase engagement. Companies can boost user engagement by concentrating on the needs of the user, using machine learning and natural language processing to make digital assistants responsive and intuitive, utilizing high - quality data and algorithms to improve accuracy and reliability, and using machine learning to personalize the user experience. Businesses can boost sales, lower expenses, and enhance customer satisfaction by monitoring user engagement.

A variety of intelligent systems that gather information from your interactions and preferences are included in digital assistance technology. These systems, which are frequently driven by natural language processing (NLP) and artificial intelligence (AI), can:

- Recognize your voice: When you talk to your device, it will react instinctively, enabling you to perform tasks like appointment scheduling, reminders, and smart home device control.
- Consider your needs ahead of time: Your assistant can make proactive suggestions, change settings, and even anticipate your needs based on your habits and preferences.
- Customize your encounter: Comprehend your inclinations and customize its reactions to your distinct requirements and passions.
- Link you up with the outside world: allow you to control your whole environment with gestures or voice commands by integrating seamlessly with other devices and services.

The advantages are indisputable:

- Enhanced productivity: Automate repetitive chores to free up time for more important things.
- Increased convenience: Take easy control of your surroundings and relish a cosier, more tailored experience.
- Enhanced safety: Smart home security systems and voice - activated auto features can improve security and comfort.
- Accessibility: By offering hands - free operation and individualized support, digital assistants can give persons with disabilities more power.
- Digital assistance technology is not merely a thing of the future; it is already here and developing quickly. Smart homes, cars, smartphones, and even healthcare are examples of how technology is changing our lives in exciting ways.

Once limited to science fiction, digital assistants are now commonplace companions in our everyday lives. These intelligent systems, which range from the ubiquitous Siri and Alexa to the voice - activated interfaces in our homes and cars, are radically altering the way we engage with technology. Beyond their novelty and ease of use, though, it is essential to comprehend user interaction with these assistants to properly design and implement them. This paper examines the complex relationship between the psychological, social, and technological aspects of user engagement and how they are influenced by it.

The Future of Engagement: User engagement will always be a top priority as digital assistants develop further. Context

awareness, ongoing learning, and personalization will be essential to creating assistants that anticipate our needs and fit in with our lives naturally. In addition, the emergence of embodied AI—that is, robots with AI—raises intriguing concerns about the direction of human - machine interaction and the possibility of even more profound engagement.

Recognizing how users interact with digital support Technology involves more than just maximizing features and functionalities; it also entails comprehending the intricate interactions between social dynamics, psychology, and technological design. By considering the various aspects that affect engagement, we can create assistants that are not just effective but also pleasurable, educational, and even able to create deep connections. The imperative in this era of sentient machines is to make sure that technology advances humankind, not the other way around.

2. Review of Literature

a) Sara Montagna & Alessandro Ricci (2017): This project aims at exploring the fruitful integration of software personal agents with wearable/eyewear computing, based on mobile and wearable devices such as smart glasses. The key functionality of Trauma Tracker is to keep track of relevant events occurring during the management of a trauma, for different purposes. The basic one – discussed in detail in this paper – is to have an accurate documentation of the trauma, to automate the creation (and management) of reports and to enable offline data analysis, useful for performance evaluation and to improve the work of the Trauma Team.

b) Christian Bayer, Phillip Bausch, Joachim Metternich (2019): This paper presents a framework to analyse the influence of digital assistance systems on essential target variables in a production system. For this purpose, functions of the digital assistance system, effects on the employee and key performance indicators are defined. From this, hypotheses are derived to describe the effect of digital assistance systems on employee performance. Subsequently, a concept for the verification of the framework and the hypotheses is presented.

c) Alinde Keller, Florian Wachowski, Martin Woitag, Steffen Sauer & Dirk Berndt (2022): This chapter surveys current technological building blocks, methods and implementation strategies for the design and development of such solutions. First, the authors describe specific implementation and development strategies with a sociotechnical design approach. The goal of such strategies is to develop effective solutions that employees accept and use on a sustained basis. One prerequisite for this is that selected technologies are designed to be conducive to learning and comply with human factors standards. To this end, criteria are developed, which have an impact on success and therefore ought to be ascertained and incorporated in design.

d) Katja Gelbrich, Julia Hagel, Chiara Orsingher. The increase in satisfaction occurs via the perceived warmth of the digital assistant, and the increase in persistence via the serial mediation of perceived warmth and satisfaction. Further, the results of a moderated serial mediation show that the effect on persistence only occurs when a digital (but not when a human) assistant provides emotional support in technology - mediated services. Finally, the effect of emotional support on persistence occurs independently of the digital assistant's embodiment. Practitioners learn how to imbue technology - mediated services with a human touch, inducing favourable customer outcomes.

e) Roberta De Ciccoa (2020): The study adopts an experimental design to investigate the effects of a social - versus task - oriented interaction style chatbot on the level of social presence and trust (social outcomes), perceived enjoyment (affective outcome), and intention to use the conversational OFD service in the future (behavioral intent outcome). Findings from a sample of 171 participants show that the interaction with the chatbot set up with a social - oriented interaction style increased users' perception of social presence and perceived enjoyment, while it did not have any direct and significant effect on trust and intention to use.

f) Graça Miranda Silva, Álvaro Dias, Maria Simão Rodrigues This study proposes an integrated model based on the health belief model and the technology readiness and acceptance model to better understand the determinants of users' continuance intention to use FDAs. Empirical data collected from 288 Portuguese users of FDAs during the pandemic was analyzed using partial least squares structural equation modeling. The results show that both the perceived susceptibility to and severity of COVID - 19 infection positively influenced the perceived usefulness of food delivery applications. Technology readiness is also a predictor of perceived usefulness.

g) Wilert Puriwat, Suchart Tripopsakul: This study investigates the factors that have influenced the adoption of food delivery mobile application technology during the pandemic in Thailand. The research model was adopted from the Unified Theory of Acceptance and Use of Technology (UTAUT) model, integrating perceived fear of COVID - 19. Empirical research was conducted using data from 223 food delivery mobile application users in Thailand, with Structural Equation Modelling used to validate the model and analyse the hypotheses. The results indicate that the intention to use food delivery applications was significantly influenced by social influence, performance expectancy, effort expectancy, and perceived fear.

h) M Krzywdzinski, S Pfeiffer, M Evers, C Gerber (2022) Digitalization of work means that technology is moving closer to the bodies of employees. It can make movements, vital signs and even emotions visible. Technologies which many people use privately to monitor their sporting activities or health opens a new dimension of control in the workplace, but also the possibility of supporting employees in complex work processes. Based on case studies of companies in manufacturing and logistics as well as a survey of employees, this study provides insights into operational use cases of wearables and the assessments of employees.

i) A Lindquist, P Johansson, G Petersson (2008) The aim of the present review was to obtain an overview of existing research on the use of PDAs among personnel

and students in health care. This overview of the use of PDAs revealed a positive attitude towards the PDA, which was regarded as a feasible and convenient tool. The possibility of immediate access to medical information has the potential to improve patient care. The PDA seems to be a valuable tool for personnel and students in health care, but there is a need for further intervention studies, randomized controlled trials, action research, and studies with various health care groups to identify its appropriate functions and software applications.

j) T Keller, M Behling, C Stockinger, J Metternich, K Schutzer (2021) This paper examines the impact of digital assistance on labor productivity (hourly output) and experience of use in dependence on process complexity and employee competence. Within the framework of an empirical study in the process learning factory CiP of the TU Darmstadt, the effect was quantified using the example of a typical assembly process. This paper presents the concept and the results of the study. After the classification of an assembly task, these results can be used to support the selection decision for a digital assistance system according to cost–benefit aspects.

Research Methodology

Research methodology refers to the systematic approach, techniques, and strategies used to conduct research, gather information, analyse data, and draw conclusions in a scientific and structured manner. It serves as a roadmap that outlines the steps and procedures followed by researchers to answer specific research questions, test hypotheses, or explore phenomena.

Research methodology provides the framework for ensuring the reliability, validity, and credibility of research findings.

Target Population:

For this study, the target population is the youth who are using digital assistance technologies.

Data collection and Sampling:

It is primary data collected from the respondents through structured questionnaire which is framed based on five - point Likert scale.

Sample size: 149 Hypothesis:

Hypothesis 1: Users are more engaged with digital assistance technologies that are easy to use. and understand.

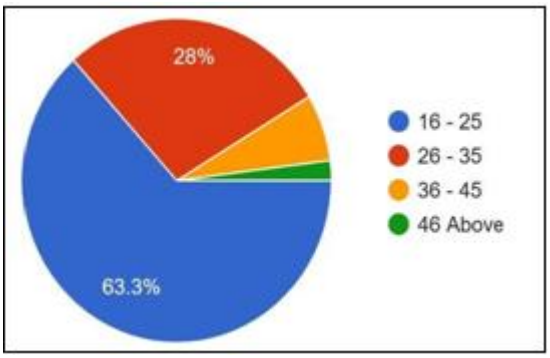
Hypothesis 2: Users are more engaged with digital assistance technologies that can perform tasks accurately and efficiently.

Research Objectives:

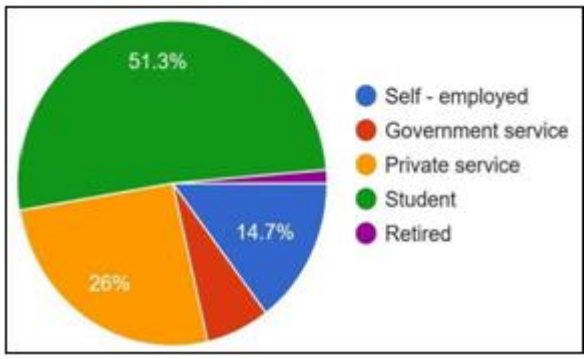
The research project has following objectives:

- To determine the important elements that affect user's utilization of digital assistance technologies (DAT).
- To create a model of user interaction with DAT's that may be applied to user behaviour prediction and explanation.
- To comprehend how user interaction with DATs affect user satisfaction, productivity, and other results.
- To investigate the variations in user interaction with DATs among various user groups, such as demographics, age brackets, and cultural backgrounds.
- To determine and assess methods to enhance DATs usability, accessibility, and overall user experience.

3. Data Analysis



The majority of the survey participants are in the age group of 16 – 25 i. e the youth which is 63.3%, and 28% are in the age group of 26 - 35.



The highest percentage is 51.3% who are the students who have responded for the survey, who were the majority for using the digital assistance technologies.

Table 1: Descriptive statistics

Descriptive Statistics			
	Mean	Std. Deviation	N
Satisfaction	3.6577	0.89119	149
Factors influencing	2.2819	1.36600	149
Familiarity	2.1477	1.02256	149

- A mean of 3.66 suggests that people are generally in agreement. This is, however, marginally below the neutral point of 4, indicating potential for improvement.
- A moderate dispersion of the data is indicated by the standard deviation of 0.89. This indicates that although the overall satisfaction rate is 3.66, some people's satisfaction levels were noticeably higher or lower.

Table 2: Cross Tabulation

Cross tabulation							
Count							
	On a scale of 1 to 5, how 4 are you with your experiences using digital assistance tech2logies?						
	1	2	3	4	5	Total	
Gender	Male	3	2	20	54	14	93
	Female	2	7	16	27	4	56
Total		5	9	36	81	18	149

- The distribution of answers to the question, "On a scale of 1 to 5, how satisfied are you with your experiences using digital assistance technologies?" is displayed in this cross tabulation. divided according to gender.
- Regardless of gender, most respondents are either somewhat (3) or very (3) satisfied with their experiences using digital assistance technologies.
- Many respondents, or 68.5%, rated these technologies as either 4 or 5, indicating a favourable opinion in general. There are incredibly few respondents (5 total) in the "Very Dissatisfied" (1) and "Dissatisfied" (2) categories.
- This shows that having a bad experience with digital assistance technology is not common. The "Very Satisfied" (4) category contains the largest group for both genders. This shows that a large number of people consider these technologies to be helpful and beneficial.

Table 3: Correlations

Correlations				
		Satisfaction	Factors influencing	Familiarity
Pearson Correlation	Satisfaction	1.000	0.119	- 0.152
	Factors influencing	0.119	1.000	0.110
	Familiarity	- 0.152	0.110	1.000
Sig. (1 - tailed)	Satisfaction		0.075	0.032
	Factors influencing	0.075		0.090
	Familiarity	0.032	0.090	
N	Satisfaction	149	149	149
	Factors influencing	149	149	149
	Familiarity	149	149	149

- All correlations have p - values less than 0.1, indicating statistical significance at the 1 - tailed level. Because of the tiny effect sizes, it's crucial to keep in mind that statistical significance does not always imply practical significance.
- A weak positive relationship is indicated by the positive correlation of 0.119. This indicates that people's overall satisfaction tends to slightly increase as they give greater weight to the factors influencing their satisfaction. The tiny magnitude, however, indicates that other factors probably have a greater impact on satisfaction.

Table 4: Coefficient Correlations

Coefficient Correlations[a]				
Model			Familiarity	Factors influencing
1	Correlations	Familiarity	1.000	- 0.110
		Factors influencing	- 0.110	1.000
	Covariances	Familiarity	0.005	0.000
		Factors influencing	0.000	0.003
a. Dependent Variable: Satisfaction				

- The percentage of each independent variable's variance that can be attributed to the other variables is displayed in the table.
- The variance proportion for the third eigenvalue in familiarity is 66%, a high value that suggests other variables in the model account for a significant amount of its variance. Redundancy and possible multicollinearity are suggested by this.

Table 5: Coefficient

Coefficientsa										
		Unstandardized Coefficient s		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
Model		B	St d. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3.766	0.198		19.045	0	3.375	4.157		
	Factors influencing	0.089	0.053	0.137	1.681	0.095	-0.016	0.195	0.988	1.012
	Familiarity	-0.145	0.071	-0.167	-2.047	0.042	-0.286	5	0.988	1.012
a. Dependent Variable: Satisfaction										

- The findings of a regression analysis with satisfaction as the dependent variable and familiarity and factors influencing as the independent variables are shown in this table.
- Constant (3.766): This is the expected level of satisfaction in the case where the two independent variables have zero values.
- Factors Influencing (0.089): This means that the predicted satisfaction should rise by 0.089 for every unit increase in Factors Influencing.
- Familiarity (- 0.145): This indicates that the expected satisfaction is expected to fall by 0.145 for every unit increase in familiarity.

Table 6: Anova Test

ANOVAa						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.889	2	2.444	3. 168	.045b
	Residual	112.655	146	0.772		
	Total	117.544	148			
a. Dependent Variable: Satisfaction						
b. Predictors: (Constant), Familiarity, Factors influencing						

- The overall significance of the regression model in explaining the dependent variable, satisfaction, is shown in this ANOVA table.
- Squares total (4.889): This shows how much of the Satisfaction variance the regression model explains.
- df (2): This is a reference to the quantity of independent variables (Factors Influencing and Familiarity) in the model.
- Squared Mean (2.444): The average explained variance for each independent variable is shown here.

4. Findings and Conclusions

1) The people in majority, or 54.4% of the population, are content with their lives in general.
2) However, a substantial minority—12.1% dissatisfied—are not happy, possibly due to issues with their relationships, finances, or health.
3) The chart, which is based on a single survey, does not specify the causes of satisfaction or dissatisfaction.
4) The model summary table indicates that it explains 4.2% of the variance in the dependent variable, despite having a low R - squared value of 0.045.
5) Two factors influence it: familiarity and influencing factors.
6) Familiarity is the only significant predictor that can explain 4.2% of the variance.
7) The predictive power is moderate, with an adjusted R - squared value of 2.8%. Of the two predictors in the model, familiarity is the only one that significantly affects the model.
8) According to the ANOVA table, the model is statistically significant, indicating a significant joint relationship between the predictor variables (satisfaction and factors influencing familiarity) and the dependent variable.
9) Even with its low R - squared value, the model accounts for 4.2% of the variation in satisfaction.
10) The mean square of the regression model (2.444) is greater than the mean square of the residual error (0.772), indicating that a significant amount of the variation in satisfaction can be explained by the model.
11) However, the R - squared value is relatively low.
12) The two predictor variables included in the coefficients table of a regression model predicting satisfaction are factors influencing and familiarity.
13) The unstandardized coefficients show that familiarity and satisfaction have a slight negative relationship, while factors influencing satisfaction have a slight positive relationship.
14) The t - values for both variables are not statistically significant at the 0.05 level, hence the null hypothesis cannot be disproved.
15) The 95% confidence interval for both factors and familiarity shows that the true population value of the coefficient is between - 0.016 and 0.195.
16) Tolerance values for both predictor variables are greater than 0.1, and VIF values are less than 10.

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