Investigating the Influence of Interaction Concerns on Willingness to Use Digital Tools in Mental Health Practices

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Abstract

The use of digital tools in mental health practices, such as videoconferences, has gained popularity in recent years due to their effectiveness in aiding therapy. However, barriers like psychologists' attitude and interaction concerns towards digital tools hinder psychologists' implementation. Existing studies on psychologists' digital tool usage and interaction concerns did not include psychology students, indicating a lack of knowledge about their specific concerns. The aim of this study is to investigate how interaction concerns, regarding communication and privacy, influence psychology students' willingness to use digital tools in mental health practices.

The study was designed as a cross-sectional survey and included 49 participants, that were mainly in their 3rd year of Bachelor. The survey included the Digital Literacy scale, a Willingness to use scale, derived from the shortened version of the Technology Acceptance model (TAM), and a self-developed Interaction Concerns scale, with Privacy Concern and Communication Concern subscales. The data analysis included a factor analysis, to identify underlying structures, which were used for multiple linear regression model analysis with a control variable to assess the relationship between variables.

The factor analysis determined three factors, concluding that the subscales are not separate scales. Therefore, new constructs *Risks of Client Interaction* and *Benefits of Client Interaction* were named and redefined. The multiple linear regression model determined no significant relationship between the independent variables Risks of Client Interaction and Benefits of Client Interaction and dependent variable Willingness to use, even when controlling for Digital Literacy, was found.

The main findings conclude that Interaction Concerns did not significantly influence psychology students' willingness to use digital tools in mental health practices. For future research, the Interaction Concerns scale should be adjusted and made more reliable, while also including older psychologists to explore age-differences in perceived concerns.

Investigating the Influence of Interaction Concerns on Willingness to Use Digital Tools in Mental Health Practices

The COVID-19 pandemic demonstrated how digital technologies could change and transform the delivery of mental health practices (Bucci et al., 2019; Drigas et al., 2011). After the pandemic ended, there was further demand for digital mental health interventions due to their advantages, such as flexibility and time-efficiency, as well as the overall satisfactory experience expressed by clients (Sorkin et al., 2021; Simms et al., 2011). Especially, psychotherapy via videoconferencing gained importance during the pandemic because it provided two-way communication with the client by combining technological tools with therapeutic communication (Margherita et al., 2024; Simms et al., 2011; Botella et al., 2009). In recent years, multiple new digital medical health innovations have been developed, such as VR, which can be used to practice social interactions for clients with social anxiety and perform exposure therapy (Takata et al., 2023); however, the implementation rates of such more advanced tools remain low, despite the evidence of their effectiveness (Conti et al., 2019; Lukka et al., 2023; Simms et al., 2011; Dores et al., 2020; Scott et al., 2023).

The reason for the lack of usage can be multifaceted. However, it is primarily based on the psychologist's needs, preferences, and perceived effectiveness for the willingness to use technology, as well as the perceived lack of knowledge of how to use them accurately (Lukka et al., 2023; Simms et al., 2011; Oksavik et al., 2024). Consequently, teaching psychology students early about new digital tools and interventions could enhance their future willingness to use digital tools in mental health practices (Zhang et al., 2023). Moreover, a psychologist´s attitude towards digital tools such as videoconferences, is also significantly influenced by ethical considerations and interaction concerns, and its negative consequences, including confidentiality breaches and less effective therapeutic alliances (Stoll et al., 2020; Adams, 2024; Landers et al., 2023). Nevertheless, to our awareness only a few existing studies included psychologists and psychology students in their research on digital tools in mental

health practices and concerns about client interaction that diminish the implementation, such as Gado et al. (2022) and Zhang et al. (2023). The majority, for example, Bocanegra et al. (2024) and Domann et al. (2025), have studied digital tools that were primarily used in the context of learning in classes with technology and how digital tools can influence the development of students. Therefore, it is crucial to research what exactly inhibits or discourages the psychology student´s, consequently future psychologist´s, uptake to use digital health tools in their future practice to aid in providing mental healthcare and therapy.

Digital mental health tools and their barriers and facilitators of use

Digital mental health tools can offer services like diagnostics, assessments, e-therapy, counselling and more through the usage of ICT by licensed psychologists when both are in separate locations (Drigas et al., 2011; Manhal-Baugus, 2001; Simms et al., 2011) or even be used in a blended approach, where face-to-face sessions are combined with technological tools (Bucci et al., 2019; Lukka et al., 2023; Fairburn et al., 2017). These interventions and services can be digitally mediated by using, for example, emails, text, audio-video conferencing, mobile devices, computers, virtual and augmented reality, and chatbots (Fairburn & Patel, 2017; Drigas et al., 2011; Botella et al., 2009; Light et al., 2024)

There are several facilitators to utilising technology in mental health practices. Firstly, the usage of digital-mediated interventions aids with physical, geographical and time efficiency for both parties (Bucci et al., 2019; Botella et al., 2009; Simms et al., 2011). For example, when applying videoconferences, it can encompass more flexibility and more timely interventions in cases of crisis interventions (Stoll et al., 2020; Botella et al., 2009; Manhal-Baugus, 2001). Moreover, the presumed distance through videoconferencing or digital-mediated interventions can provide the client with a sense of anonymity (Bucci et al., 2019; Stoll et al., 2020; Simms et al., 2011) and be interpreted as a “safe environment”, making them more open to share their emotions and be less threatened about improving social

interactions (Fairburn et al., 2017; Botella et al., 2009).

Barriers that can hinder the willingness to use digital tools in mental health practices can be mostly identified by taking psychologists` needs, attitudes, willingness and preferences into account, as it is vital to the successful integration (Lukka et al., 2023; Simms et al., 2011; Pote et al., 2021). Although, some research and studies present evidence that digital health tools are effective, most psychologists show reserve in their personal preference for implementing them in their practice (Conti et al., 2019). A concerning point for psychologists when solely implementing online interventions is the higher risks of dropout, particularly with the perception of less motivation and commitment from the client during those sessions (Margharita et al., 2024; Stoll et al., 2020; Dijksman et al., 2017).

Another important barrier that influences psychologists' preference and willingness towards using digital tools is their perceived lack of training in technological tools, which would be needed for further usage of technology (Dores et al., 2020; Bucci et al., 2019; Conti et al., 2019; Stoll et al., 2020; Zhang et al., 2023; Scott et al., 2023). This claim is further supported by the information that the perceptions of technology difficulty correlate with the frequency with which digital tools are deployed in mental health practice (Simms et al., 2011). Nevertheless, younger psychologists and students have a significantly more positive attitude and higher interest towards technology utilisation, based on the few existing studies that included students in their sample (Stoll et al., 2020; Carrasco et al., 2025; Zhang et al., 2023). Additionally, in general, younger individuals are more open-minded towards digital tools and technology since they grew up with these innovations (Morris & Venkatesh, 2000). However, not many studies include psychology students in their population sample, but including them as early as possible in the use of digital tools could therefore improve implementation and willingness to use. In contrast, some older psychologists keep a negative view of digital tools, saying that it is damaging the profession's image and making it difficult

to maintain professionalism (Stoll et al., 2020). Additionally, older individuals in general had less time to get accustomed with technology, which can explain their preference for traditional approaches, rather than trying to learn and adapt new digital tools (Morris & Venkatesh, 2000; Perle et al., 2013), especially regarding their lacking perceived digital knowledge (Wu & Sonne, 2021). Moreover, at the present time, there are too many knowledge gaps, including a lack of digital health care tools competencies and skills that are currently not sufficiently implemented in training courses of clinical psychologists and psychology students (Pote et al., 2021; Stoll et al., 2020).

Lastly, interaction concerns and ethical considerations can influence a psychologist's willingness towards the implementation of digital tools in mental health practices (Drigas et al., 2011; Manhal-Baugus, 2001; Carrasco et al., 2025), to which also needs to be said that current research has not focused on how interaction concerns have prevented the use of digital tools, only indicated that it can be a potential barrier to its implementation. Limited research regarding the validity and reliability of rapidly developing digital tools and the implementation strategies of those is also a current barrier to the willingness of psychologists to use digital tools in their practice (Stoll et al., 2020; Pote et al., 2021; Smith et al., 2023).

Interaction concerns of the usage of digital tools in mental health practices

Interaction concerns are a constant aspect that accompanies the usage of digital tools. Several of those concerns in interactions can be recognised as barriers to the usage of digital tools and can be categorised into groups. One such group includes concerns regarding the need for qualified and accurate information and exposure to such information when implementing self-help programmes to ensure clients only receive certified information (Drigas et al., 2011; Fairburn et al., 2017). There is an essential concern about the requirement for scientific and reviewed information that is evidence-based for solely digitally mediated interventions. (Drigas et al., 2011). Notably, in self-help programmes and digital health tool

interventions that occur without guidance from a psychologist, scientifically approved information is essential because otherwise the data quality cannot be concretely judged (Drigas et al., 2011; Fairburn et al., 2017; Lukka et al., 2023). Additionally, psychologists often express their concern regarding the effectiveness and efficacy of digital tools, even though some are shown to be effective based on studies; the perceived effectiveness influences the psychologists` willingness to use them in mental health practices (Scott et al., 2023; Dijksman et al., 2017). Another important aspect of client interaction that can influence the willingness to use digital tools is the concern regarding the privacy of data and confidentiality. One of the most important concerns that prevents usage in digital health tools is that the privacy of the client and the psychologist can be compromised (Drigas et al., 2011; Botella et al., 2009; Stoll et al., 2020; Carrasco et al., 2025) through, for example, data leakage. An example that can be identified as a privacy concern is that confidentiality in videoconferencing and other digital tools cannot be guaranteed because, for example, of third parties (Lukka et al., 2023; Botella et al., 2009; Manhal-Baugus, 2001). Lastly, data protection and storage of clients' data is a concern that still prevails primarily during digital-mediated communication methods (Bucci et al., 2019; Botella et al., 2009; Carrasco et al., 2025).

Other interaction concerns as to why psychologists are less likely to use digital tools in mental health are related to communication. The biggest concern about communication in digital-mediated interventions is the perceived coldness and dehumanisation of the therapeutic environment, which makes communication challenging, especially through the loss of non-verbal cues (Lukka et al., 2023; Manhal-Baugus, 2001; Stoll et al., 2020; Margherita et al., 2024). Furthermore, psychologists stress that the loss of accurate observation of non-verbal cues and behaviours would negatively influence their ability to assess and intervene in case of emergencies, since only part of the body can be observed (Manhal-Baugus, 2001; Stoll et al., 2020; Mayer et al., 2024). For psychologists, this is the reason why they generally prefer face-

to-face contact with clients to make sure they can maintain this relationship (Simms et al., 2011), while it is also preferred to use digital health interventions in conjunction with face-to-face therapy (Lukka et al., 2023). Moreover, the potential loss of communication because of clients dropping out and social isolation is another aspect that needs to be considered (Botella et al., 2009; Stoll et al., 2020; Margherita et al., 2024). Especially because the distance and convenience given by online therapy sessions could facilitate avoidance behaviour of clients and amplify their social isolation and intimacy with their social environment (Margharita et al., 2024; Bucci et al., 2019; Botella et al., 2009). Finally, the most important concern related to client communication is the possibility of losing or lessening the effectiveness of the therapeutic relationship through the use of digital tools, such as videoconferencing, because of the perceived distance between psychologist and client (Stoll et al., 2020; Simms et al., 2011; Bucci et al., 2019). For psychologists, it is generally vital to build and maintain a therapeutic relationship with their clients, which is important for good communication and progress in meeting their needs (Simms et al., 2011; Lukka et al., 2023). However, they raise a critical concern regarding their doubt and fear about the possibility of not being able to establish a therapeutic relationship, because it takes significantly longer to build trust in solely digital mental health interventions (Margharita et al., 2024).

The aim of this study is to research whether interaction concerns regarding communication and data privacy in client interaction increase or hinder students willingness to use digital tools in their future mental health practice. Based on this aim and the background information gathered, the research question *"How do the concerns about communication and privacy of data in client interaction influence psychology students' willingness to use digital tools in mental health practices*?" was formed. Moreover, the following hypotheses were considered:

H1: Psychology students who are concerned that communication and privacy of data in client interaction will be negatively impacted by digital tools (e.g. videoconferencing) are less willing to use them in mental health practices.

H2: Psychology students who perceive communication and privacy of data in client interaction while using digital tools as effective are more willing to them (e.g. videoconferencing) in mental health practices.

Methods

Study Design

This study was designed as a quantitative cross-sectional online survey that was part of a larger project with two other students, whereas only part of the results was included and needed for this specific research. The dependent variable researched in this study concerned *Willingness to use* digital tools, while the independent variables focused on *Benefits of Client Interaction* and *Risks of Client Interaction* and a control variable *called Digital Literacy*.

Participants

A purposive sample, with the specific inclusion requirements of being at least 16 years old, a psychology student and being proficient in English, was recruited. The aim of the purposive sample was to recruit as many participants as possible within a given timeframe. Fifteen participants did not fully complete the measures, which were excluded from the final sample. After identifying nine participants that did not meet the inclusion criteria of being a psychology student, the inclusion criteria were broadened to psychology students and social studies, such as communication science. As a result, three participants were excluded, that studied Law, Engineering and Business Administration. Lastly, an additional three responses were excluded, because they consisted of only study previews performed by the researchers. Considering all this, the final sample consisted of 49 responses.

Procedure

Before the study was made available to the participants it received ethical approval by the Ethics Committee from the University of Twente (250530). The participants were able to access the study through the provided link, via social media and WhatsApp, and the SONA system, which connected them to the Qualtrics website. The study was mainly advertised on SONA-system where students can participate in studies in exchange for course credits. Moreover, a snowballing technique was conducted to distribute the link to the study to friends that study psychology at another university, that asked their friends to participate as well.

During the completion of the survey no researcher was presented, since it was an online study. In the opening page of the survey, the participants were introduced to the study by providing them with further information of the procedure and its aim. Afterwards, they were asked to give informed consent and were made aware of the fact that they could withdraw from the study at any point. Moreover, they were assured that their information was collected anonymously. Following the introduction, demographic data like age, gender, nationality, study program, study year, and university they are enrolled in were asked via prewritten answers they had to select or make use of the empty box provided for "Other namely" options. Next, the different statements per scale were provided, which were divided into three parts (Digital Literacy; Technology acceptance, Social Influence and Professional Role Perception; Values). The study itself was part of a larger project, so there were statements included from research partners, that were not directly relevant to this paper´s research. In total, there are 107 statements included in the survey, excluding the initial demographic questions. The participants were asked to answer each statement on a 7-point Likert scale from 1 strongly disagree to 7 strongly agree.

Materials

Digital Literacy was measured with the Digital Literacy scale (Wardhani et al., 2019)

including 9 items (e.g. I can tell the difference between trustworthy and untrustworthy sources of information online"). All items were measured on a 7-point Likert scale, ranging from "strongly disagree" to "strongly agree" (Appendix B).

The willingness to use technology in future mental health practices was measured with a shortened version of TAM scale by Tubaishat (2018), especially the Perceived Usefulness (6 items) and Perceived Ease of Use (6 items) scale with a total of 12 items (e.g. "Digital technology will be an essential part of my future professional practice" and "I find digital tools easy to learn and use"). This scale was measured on a 7-point Likert scale, ranging from "strongly disagree" to "strongly agree".

Interaction Concerns regarding communication and privacy about data when using digital tools were measured on a self-developed scale, based on sources and articles that specified concerns that accompany or hinder digital tools usage (e.g. Drigas et al., 2011; Lukka et al., 2023; Stoll et al., 2020; Margharita et al., 2024). The scale consists of two aspects namely communication (6 items, e.g. "I believe that the use of digital tools limits the interpretation of non-verbal cues") and privacy (3 items, e.g. "I believe that using digital tools such as videoconferences and emails compromises privacy for both my future client and me") in total 9 items were all measured on a 7-point Likert scale, ranging from "strongly disagree" to "strongly agree".

Scale Development

The purpose of the new Interaction Concerns scale with the subscales of Privacy Concern and Communication Concern was constructed in order to measure participants concern about breaches or privacy while working with patients while making use of digital tools. Additionally, it was intended to assess participants concern regarding efficiency of communication when using digital tools. Moreover, the reason for the development of this scale is fundamentally that there were no existing scales that encompass the constructs needed

for this study.

For this reason, the items were solely created based on theory and literature gathered, especially based on the work from Margharita et al. (2024), Stoll et al. (2020), Drigas et al (2011), Lukka et al. (2023) and Botella et al. (2009), where especially communication and privacy concerns were discussed and discovered. Furthermore, initially nine items were created, which were then revised after an Exploratory Factor Analysis (EFA) was conducted to measure the content validity, after which all items were retained, because of acceptable factor loadings and the need for theoretical relevance. Since the scale was not tested before the main study, there were no considerable changes before the study.

Consequently, the number of items retained were nine which were all measured on a 7-point Likert scale (ranging from “strongly disagree” to “strongly agree). In addition, two items were scored and analysed through reverse-coded items, whereas the other five items were scored negatively. Nevertheless, during further analysis, the reliability of the scales was measured through the Cronbach´s α and the content validity of the items tested through the Exploratory Factor Analysis (EFA).

Data analysis

The data was downloaded from the Qualtrics website and fully analysed using RStudio version 2025.05.0 (496). First, the dataset was cleaned by transforming all answers into numeric values, there were no outliers identified using means and standard deviations, and not fully answered survey were excluded. The number of excluded unfinished survey responses were fifteen and three survey previews. Moreover, it was not strictly checked whether participants answered the attention question correctly, as to not lower the sample size even further. The data gathered from Qualtrics include all statements and demographic questions about the participant.

The first step of the data analysis is to calculate all the demographics of the data, like

percentages, standard deviations and means, which was done in RStudio, via calculating each demographic columns mean and standard deviation, as well as the mean and standard deviation of responses per scale. The data was saved on the Qualtrics website. The different results and percentages can be extracted from the website and inserted into a dataset in R Studio.

Before conducting a factor analysis and excluding items, a suitability measure was applied using the Kaiser-Meyer Olking (KMO), which measured the sampling adequacy (0.58), which was slightly below the mediocre threshold of .60 (Tabachnick & Fidell, as cited in Shrestha, 2021), indicating the sample to be only slightly sufficient. Moreover, with a low MSA item score of 0.35 for Q75 and 0.44 for Q67 and Q62, it can be seen that some items are not strongly related to others. The second suitability test performed was the Bartlett, which measures the sphericity with a significant value of $p < 0.05$, indicated that the correlation matrix differs significantly from an identity matrix (χ^2 (210) = 450.07, $p < .001$), which in turn makes the data suitable for a factor analysis. Afterwards an Exploratory Factor Analysis (EFA) with a regression score method was conducted, in order to identify factors measured in the Interaction Concerns (nine items) and Willingness scales (12 items). Additionally, it identifies the constructs that might have an underlying factor and analyse relationships between those variables. Items were reassigned to new factor labels, as new separate scales. Furthermore, a second factor analysis using the Bartlett score method was conducted to test the suitability of the items. For the analysis a common threshold of ≥40 was used to cut off lower factor loading items (Stevens, 2001). The factor analysis of the three identified factors during the parallel analysis were conducted with the rotation method “varimax”. Lastly, the measure Cronbach´s α was conducted again, to gain insight in the reliability of the new scales with a threshold of >.70 as acceptable (Hussey et al., 2025).

Before continuing with further analysing the data, the assumptions (Linearity,

Normality, Homoscedasticity, Multicollinearity) are assessed, using a Scatterplot (residuals vs fitted plot), Q-Q Plot and Shapiro-Wilk normality test, the Breusch-Pagan test, Robust SE and the Variance Inflation Factor (Appendix C). Lastly, the homogeneity of variance will be computed using the Levene´s test for each independent variable. All Assumptions were met, and further analysis could be done. Moreover, the Inter-Item correlations for the newly identified Willingness scale with excluded items were computed.

Afterwards a multiple linear model regression analysis with the newly identified factors namely, independent variables *Risks of Client Interaction* and *Benefits of Client Interaction* and dependent variables *Willingness to use* technology in future mental health practices, is conducted, which aids in identifying where students agree with each other and where opinions differ. Additionally, the data in the model was subjected to a linear model regression analysis with the control variable *Digital Literacy*.

Results

Participants

The final sample data for further analysis consists of 49 participants with the mean age of 24.27 (*SD* = 6.45). Of those participants 25 identified as female (51.02%), 20 identified as male (40.82%), three identified as non-binary (6.12%) and one preferred not to disclose this information (2.04%). While most of the students are enrolled in the University of Twente (n = 43, 87.76%), six others represented other universities namely, Leibniz University Hannover, Osnabrück University, Münster University, Bergische Universität Wuppertal, Breda University of Applied Sciences and one did not disclose their university. The participants completing the study were mostly 3rd year Bachelor students (n = 17, 34.69%), nine are 2nd year Bachelor students (n = 9, 18.37%), 14 participants from the 1st year Bachelor (28.57%), five 4th year Bachelor students (10.20%), one 3rd year Master student (2.04%) and three participants with a PhD (6.12%). The nationalities include 19 Dutch, 26 German, one Swiss,

one Macedonian, one Chinese and one not disclosing their nationality. Finally, 87.76% of participants selected Psychology as their study program (n = 43), while five students disclosed Communication Science as their study program, and one participant not disclosing this information. The average duration measured in seconds for completing the survey was 1355.8 seconds (*SD* = 1135.4).

Factor Analysis

In the first factor analysis, willingness items were loading on different factors, however for the theoretical relevance all willingness items should load onto a singular factor. Consequently, the factor analysis was repetitively conducted, where one-by-one items were excluded. Factor 2 represented willingness to use digital tools. However, items that had a high loading on another factor, Q57 and Q64 (>.40) were removed. After removing them, ten items remained in the willingness scale, as can be seen in Table 1, while the KMO measure (0.61) was now slightly above the threshold and the p-value remained significant ($p < 0.001$). A parallel analysis was used throughout the factor analyses that determined at the end of the analysis the number of factors to be three (PA1, PA2 and PA3). Table 1 visualises the factor loadings for each item were measured.

Table 1

Factor Loadings for a three-factor Analysis with a Regression Factor Score Method

Items	Factor loading		
	1	2	3
Factor 2: Willingness to use			
Q56: Using digital tools in psychological practice will enhance my effectiveness as a future psychologist	0.05	**0.73**	-0.10

Q58: I believe digital tools will make my work as a psychologist more efficient	-0.04	**0.54**	-0.02
Q59: Using digital interventions will increase my ability to help clients	0.00	**0.58**	0.42
Q60: Incorporating digital tools in therapy will improve client engagement and outcomes	0.10	**0.50**	0.04
Q61: Digital technology will be an essential part of my future professional practice	0.09	**0.58**	-0.01
Q62: I find digital tools easy to learn and use	-0.12	**0.27**	0.19
Q63: I believe I can easily integrate digital technology into my future practice	0.13	**0.50**	0.49
Q65: With the right training, I would feel comfortable using digital tools in therapy	-0.07	**0.50**	0.28
Q66: I feel confident troubleshooting basic issues with digital tools	-0.10	**0.59**	-0.19
Q67: I believe digital mental health tools require minimal effort to use effectively	0.01	**0.33**	-0.09
Factor 1: Risks of Client Interaction			
Q68: I believe that using digital tools such as videoconferences and emails compromises privacy for both my future client and me	**0.64**	0.30	-0.32
Q69: I am concerned that using digital-mediated tools increase the risks of breaches in trust withing therapeutic relationships	**0.78**	0.12	-0.16

Q70: I am concerned that digital-meditated tools increase the risk of confidentiality breaches regarding clients	**0.56**	0.01	-0.19
Q71: I believe that digital tools (e.g. videoconferences) negatively influence the development of a trusting therapeutic relationship	**0.61**	-0.19	0.02
Q72: I believe that digital tools hinder the development of a genuine emotional connection during therapy sessions	**0.66**	-0.26	0.01
Q73: I believe that the use of digital tools limits the interpretation of non-verbal cues	**0.78**	0.25	0.35
Q74: I believe that the lack of non-verbal cues negatively impact the ability of psychologists to make accurate observations	**0.68**	0.06	0.46
Factor 3: Benefits of Client Interaction			
Q75: I believe that digital tools provide clear information about how personal and future client data will be used and stored	0.07	0.02	**-0.48**
Q77: I believe that digital-mediated tools such as videoconferences and emails facilitate clear and effective communication between therapists and clients	0.02	0.24	**-0.37**

Note: The factor values are primary loadings (≥.40 and the largest loading per item). Bold values represent the highest loading.

The items were all compared to identify the highest loading factor and two items, Q62 (.27) and Q67 (.33) had a factor loading lower than the acceptable threshold of ≥.40. However, item Q62 (.27) was retained because of its theoretical relevance, even though the factor loading is far below .40, because excluding it would load willingness items on separate scales again. The same explanation can be applied to the retention of item Q67. Moreover, item Q63 and Q59 have a high cross-loading above .20 in two factors, nonetheless, these two items were also retained because of their theoretical relevance and to keep Willingness loaded on the same factor. As can be identified from the factor loadings, ten items had their highest loading on the factor PA2, seven had their highest factor loading on the factor PA1 and two had their highest factor loading on the factor PA3.

The new factor labels are similar to the old theoretical constructs. PA2 included only willingness items, and all items except the two excluded items loaded onto this factor, consequently, keeping the factor label *Willingness to use*. PA1 included negatively worded items regarding concerns of communication, with the addition of some privacy components, making the Factor label *Risks of Client Interaction*. Lastly, PA3 contained respectively one communication and one privacy item, being labelled *Benefits of Client Interaction* because of the positive wording and core information it measures. It is noteworthy, that both items load negatively on the factor, meaning that higher scores on PA3 indicate an increase in realising the benefits of client interaction while using digital tools

As a precaution, a second factor analysis was conducted with the Bartlett factor score method, because it aids in identifying biases, is suitable for smaller samples and makes the results overall more reliable. It was conducted to analyse whether results would differ with the Bartlett scores. The results between the factor analysis with a regression score method and the factor analysis with a Bartlett score method did not differ significantly from each other, therefore, the Bartlett factor scores (standardised) were used for further analysis.

Scale Reliability

Subsequently, after the factor analysis the Cronbach´s α was calculated again, as a last measure, for the new final factors without deleting any items. *Willingness* has an acceptable reliability (α = .78), *Risks of Client Interaction* has a slightly higher good reliability (α = .84), while the new scale *Benefits of Client Interaction* has a questionable reliability (α = .64). Since the *Willingness* scale was the only scale that had two items with insufficient factor loadings the inter-item correlation was measured. The inter-item correlations were sufficient, with correlation for all items above .30 (Pesudovs et al., 2007). Additionally, removing the slightly slower correlating items Q62 (.32) and Q67 (.31) would not significantly increase the Cronbach´s α. The item-correlation for the *Benefits of Client Interaction* scale were also sufficient with all items above .30, while excluding Q77 (.47) would significantly decrease the Cronbach´s α (.41). Lastly, all items from *Risks of Client Interaction* had a good inter-item correlation of above .50, and excluding item Q69 (.73) would decrease the Cronbach´s α slightly (.79).

Descriptive Statistics

The descriptive statistics are presented in Table 2. *Benefits of Client Interaction* and *Risks of Client Interaction* seem similar in agreement across the participants, 4.24 and 4.93 both indicating “Neither agree nor disagree” to “Somewhat agree”. *Risks of Client Interaction* is slightly more agreed to, meaning that participants had slightly more concerns regarding client interactions. *Benefits of Client Interaction* and *Risks of Client Interaction* both seem to have little to no correlation, suggesting that these factors do not significantly relate to each other (r = 0.03). There is also no significant correlation between *Benefits of Client Interaction* and *Willingness* (r = 0.03). Meanwhile, *Risks of Client Interaction* did show a slightly higher correlation with *Willingness* (r = 0.07), but it does not indicate a significant relationship. These results visualise that there is not significant correlation between either of the study

variables, meaning that scoring high on either independent variable does not influence students' willingness to use technology.

Table 2

Descriptive Statistics and Correlations for Study Variables

Variable	*M*	*SD*	1	2	3
Willingness	5.24	0.65	—		
Benefits of Client Interaction	4.24	1.40	0.03	—	
Risks of Client Interaction	4.93	1.05	0.07	0.03	—

Note: Duration measured in seconds. Benefits of Client Interaction, Risks of Client Interaction and Willingness were measured on a 7-point Likert scale (strongly disagree—strongly agree).

Multiple Linear Regression Analysis with a Control Variable

The coefficient output for the multiple linear regression analysis with a control variable was summarised in Table 3. *Digital Literacy* was included as the control variable, to analyse that any relationship between the IV and DV are unique to the independent variables and not confounded by differences in *Digital Literacy*. Contrary to H1, students concern regarding the risks of communication and privacy of data in client interaction did not significantly predict or negatively affect participants willingness to integrate technology in further mental health practices, since *Risks of Client Interaction* does not have a significant p-value, and the confidence intervals include 0. Additionally in contrast to H2, students that perceive communication and privacy of data in client as effective did not indicate to be more willing to use digital tools, because of the non-significant p-value of *Benefits of Client Interaction*. *Digital Literacy* did not significantly influence *Willingness to use* or the

independent variables. Moreover, all of the confidence intervals include 0 making them not significant, while also all variable p-values exceed the threshold of statistical significance ($p > .05$), indicating that *Risks of Client Interaction*, *Benefits of Client Interaction* and *Digital Literacy* do not significantly predict *Willingness to use* digital tools.

Table 3

Coefficient table of Willingness with Risks of Client Communication, Benefits of Client Interaction and Digital Literacy as the control variable

Predictor	Estimate	*SE*	95% CI		*p*
			LL	*UL*	
(Intercept)	-0.41	1.98	-3.48	2.65	0.83
Risks of Client Interaction	-0.03	0.14	-0.35	0.28	0.82
Benefits of Client Interaction	-0.05	0.13	-0.33	0.24	0.72
Digital Literacy	0.07	0.34	-0.47	0.61	0.83

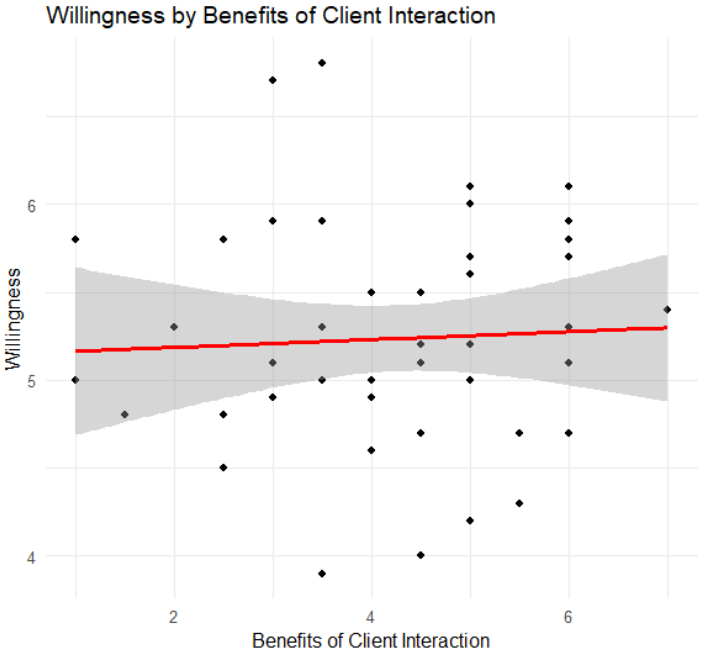
Furthermore, two scatterplots were plotted with a fitted regression line to visualise the relationship between *Risks of Client Interaction* and *Willingness* (Figure 1) and *Benefits of Client Interaction* and *Willingness* (Figure 2).

Figure 1

Scatterplot of Willingness by Risks of Client Interaction with fitted regression line

Figure 2

Scatterplot of Willingness by Benefits of Client Interaction with fitted regression line.



Discussion

The aim of this study was to assess psychology students ` willingness to use digital tools in their future mental health practice and how interaction concerns regarding privacy of

data and communication would influence students ` willingness. The need for researching this specific setting of variables was based on the lack of knowledge and research about psychology students` concerns regarding the usage of digital tools in mental healthcare. Moreover, to our knowledge, no existing studies exist that have measured the influence of interaction concerns, especially communication and privacy of data in client interaction, on the usage of digital tools in mental health practices. The existing studies that did research digital tools implementation assessed these in the context of classroom learning (Domann et al., 2025; Bocanegra et al., 2024). The results and findings gathered from this study seem to be an individual study, which was the first to be conducted with this aim.

No significant relationship between the dependent variables, *Benefits of Client Interaction* and *Risks of Client Interaction,* was found, even when compared to the control condition of *Digital Literacy*. Interpreting this result indicates that participants perceiving more benefits for the client interaction with digital tools does not mean that they perceive fewer risks, while their digital literacy skills do not influence this relationship. Consequently, there seems to be no influence of interaction concerns on students` willingness to use digital tools in mental health practices since no relationship was identified. Additionally, through the factor analysis, two new scales were identified, which were named *Benefits of Client Interaction* and *Risks of Client Interaction*, whereas no separate *Privacy* and *Communication* scale remains.

Interpreting the data shows that interaction concerns were not related to willingness to use. These results contrast with previous research and current existing results that indicate concerns regarding client interaction hinder the use of technology, because the gathered data did not indicate an influence on willingness (e.g. Drigas et al., 2011; Manhal-Baugus, 2001). A possible explanation for the newly gathered data from this study could be that younger people, especially students, are generally quite positive about the use of technological tools

(Carrasco et al., 2025; Zhang et al., 2025). Younger psychologists and students frequently have a more positive perception and attitude towards the usage of digital tools in mental health practice (Stoll et al., 2020). Older psychologists frequently have a divergent view, whereas their perceived lack of knowledge and perception of using digital tools hindering professionalism compels them to prefer traditional approaches (Stoll et al., 2020; Morris & Venkatesh, 2000; Pote et al., 2021). Since there was no significant relationship found between interaction concerns and students' willingness to use digital tools, it can be interpreted that the results from this study seem to support this theory, as it studied psychology students, who were less likely to have a negative view of digital tool usage.

The analysis of the variables identified no significant relationship between interaction concerns regarding privacy of data and communication and willingness to use digital tools, therefore, rejecting the initial hypothesis. This suggested that the level of concern about negatively impacted client interactions does not influence their willingness to use digital tools in mental health practices, as *Risks of Client Interaction* did not have a significant relationship with *Willingness to use*. These findings also contradict existing literature and research since, most importantly, studies suggested that digital conversations make communication challenging, especially when the observation of non-verbal cues is impaired (Lukka et al., 2023; Stoll et al., 2020; Manhal-Baugus, 2001). Moreover, the potential of losing the effectiveness and trust of a therapeutic relationship was one of the dominating barriers to using digital tools, which was completely contradicted by the results gathered from this study. Additionally, the fear regarding data leakage and uncertainty about the storage of client and personal data was implied to be a fundamental interaction concern that diminishes the willingness to use digital tools in mental health practices (Drigas et al., 2011; Stoll et al., 2020; Bucci et al., 2019; Carrasco et al., 2025). The possible explanation for these results can also be attributed to the possibility that psychology students possibly do not perceive

interaction concerns as a barrier to their willingness of use. However, due to the limited research on psychology students` concerns and preferences, this explanation can only be assumed. The few existing studies like Gado et al. (2022) and Zhang et al., (2023) that did include students, but did not focus on the influence of interaction concerns specifically, have shown that younger psychologists have generally a more positive attitude towards technology, meaning this could also apply to psychology students (Carrasco et al., 2025; Stoll et al., 2020).

According to the results, perceived benefits and effectiveness regarding communication and privacy of data in client interaction when using digital tools did not increase psychology students` willingness to use these tools in their mental health practices. This interpretation is based on the non-significant relationship between the variables, *Benefits of Client Interaction* and *Willingness to use*. Furthermore, these results also contradict previous literature. Notably, the most important contradicting information is that the perceived usefulness and effectiveness of digital tools in mental health practices increases psychologists' usage of digital tools (Dijksman et al., 2017; Scott et al., 2023). Based on that information *Willingness to use* should have increased when *Benefits of Client Interaction* increases. These findings could suggest that, since the population sample consisted of psychology students, the effectiveness of digital tools does not impact their willingness on whether to use digital tools or not. This indicates that for psychology students, these two variables are independent of each other. Another explanation for perceived effectiveness is based on psychologists' perception of their technological competence, meaning that lower technological competence would mean less willingness (Dores et al., 2020; Conti et al., 2019; Zhang et al., 2023), which was also not the case in this study. A possible explanation for these results could therefore be that psychology students do not base their willingness to use digital tools on their perception of the tools` individual effectiveness in mental health practices.

Digital Literacy was added as a control variable to the model, but was also not found to be related to willingness to use digital tools. Even these results are not in line with previous research, which clearly indicates that psychologists often have a negative attitude toward using digital tools because of their perceived lack of training (Dorese et al., 2020; Bucci et al., 2019; Conti et al., 2019). These literature findings would indicate that the higher the people score on *Digital Literac*y, the higher their *Willingness to use* would be. However, as this study´s results indicate, digital literacy seems to have no influence on students' willingness to use it. Moreover, the perception of technology difficulty was, according to Simms et al. (2011), correlated with the frequency with which digital tools are utilised, which was also not supported by the results of this study.

Limitations and Strengths

The most significant limitation concerns the questionable reliability and the limited number of acceptable items for the Interaction Concerns scale, newly developed for this study and its aim. Through the factor analysis and results, we learned that the Interaction Concerns scale, with its subscales Privacy and Communication, needs to be revised and adjusted. In general, more items need to be added to replace the faulty ones. The complete Interaction Concerns scale had an acceptable reliability. Nevertheless, the Privacy subscale only consisted of three items, which made it difficult to consider and remove problematic items since the reliability was also unacceptable. Consequently, the low reliability made measuring concerns regarding client interaction less reliable. Moreover, since the Privacy subscale was not identified as a separate factor during the factor analysis, the scale lacks internal consistency or conceptual clarity, through, for example, item wording. This limitation also correlates to the issue of the limited time available to develop the scale and construct the survey. Ideally, the scale would have been pilot tested, but due to limited time, this was not possible.

Another limitation of this study is that the sample size was small to begin with (n =

70), the inclusion criteria had to be broadened to keep more responses, and the unfinished responses by participants needed to be filtered out, which in such a small sample becomes very obvious (n = 49). A small sample size has several disadvantages that are essential for a significant result, such as increased bias risk, a decrease in statistical reliability, and, ultimately, a limited generalisability of the results found. Due to limited time, fewer participants had the opportunity to see our study and complete the survey, with more time, the search for participants could have extended further.

The key strength of this study is the evaluation of the influence of interaction concerns, specifically communication and privacy of data, with a population sample of students, which has not been studied in existing studies in the context of mental health practices. Furthermore, this research can provide a framework for an Interaction Concerns scale, which can be adjusted and redefined. The data gathered from this study can be used to analyse psychology students' perception of interaction concerns further and what may hinder their willingness to use digital tools in the future.

Recommendations for Future Research

Implications for future studies and practical recommendations fundamentally include creating a reliable and sufficient Interaction Concerns scale. Developing or adjusting the current Interaction Concerns scale by pilot testing would be relevant, for example, by adding new items or wording current items differently, because it would raise the reliability and, therefore, the internal consistency of the measured constructs. Moreover, it would be beneficial also to include other concerns regarding client interaction to make it more extensive and general, such as the lack of reliable information in self-help programmes and the perceived effectiveness of digital tools. Overall, it would be advised to ensure a good reliability and inter-item correlation in the Interaction Concerns scale, which was also pilot tested and adjusted accordingly.

Expanding the population sample to include more psychology students and older practising psychologists could aid in identifying the differences in various age groups. Additionally, it would be possible to identify whether the influence of Interaction Concerns on willingness to use digital tools is moderated by age and experience with using digital tools in mental health practices. Moreover, applying more specific inclusion criteria for the participants, which solely focuses on the psychology study program, could aid in verifying the variance of responses between psychology and social sciences students.

Conclusion

This study aimed to assess psychology students' willingness to use digital tools in mental health practices and how interaction concerns influence their decision. This report provides evidence that there is no statistically significant relationship between interaction concerns and willingness to use, indicating that students' willingness was not influenced by the level of concerns or perceived effectiveness of communication and privacy of data using digital tools. Ultimately, this study highlights that psychology students do not share concerns and barriers to using digital tools made by experienced and older psychologists. Instead, they seemed indifferent to their implication, challenging previous mentioned assumptions made about communication and privacy concerns regarding, for example, therapeutic alliances and data leakage, diminishing psychologists` willingness. Importantly, these results can serve as a reminder of the importance of studying psychology students' perceptions on digital tool usage and what acts as facilitators or barriers to their willingness.

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Appendix A

AI Statement

During the preparation of this work the author used Word Editor in order to aid with identifying grammar and spelling mistakes. After using these tools, the author reviewed and edited the content as needed and takes full responsibility for the content of the work

Appendix B

Coherent order of all Statements in the Scales

Table 4

Digital Literacy

Q28	I can tell the difference between trustworthy and untrustworthy sources of information online
Q29	I know how to recognise fake news, hoaxes, or biased opinions when reading content online
Q30	I can find and use information from different websites to help with school assignments
Q31	Please select “strongly disagree” here
Q32	I know how to give credit to the original sources when I use information from the internet
Q33	I know how to give credit to the original sources when I use information from the internet
Q34	I can create digital content like images, music or videos using online tools or apps
Q35	I understand the difference between personal websites and official sources
Q36	I know which information is safe to share online and what should be kept private
Q37	I think carefully before I comment or interact with others on websites or social media
Q38	I feel confident using digital tools like Microsoft Office or Google Docs for schoolwork

Q39	I try to balance my time between using digital devices and doing offline activities

Table 5

Willingness Scale

	Perceived Usefulness
Q56	Using digital tools in psychological practice will enhance my effectiveness as a future psychologist”
Q57	Digital technology will improve the quality of mental healthcare services I can provide
Q58	I believe digital tools will make my work as a psychologist more efficient
Q59	Using digital interventions will increase my ability to help clients
Q60	Incorporating digital tools in therapy will improve client engagement and outcomes
Q61	Digital technology will be an essential part of my future professional practice
	Perceived Ease of Use
Q62	I find digital tools easy to learn and use
Q63	I believe I can easily integrate digital technology into my future practice
Q64	Digital mental health platforms are user-friendly
Q65	With the right training, I would feel comfortable using digital tools in therapy
Q66	I feel confident troubleshooting basic issues with digital tools

Q67	I believe digital mental health tools require minimal effort to use effectively

Table 6

Ethical Considerations

Q68	I believe that using digital tools such as videoconferences and emails compromises privacy for both my future client and me
Q69	I am concerned that using digital-mediated tools increase the risks of breaches in trust withing therapeutic relationships
Q70	I am concerned that digital-meditated tools increase the risk of confidentiality breaches regarding clients
Q71	I believe that digital tools (e.g. videoconferences) negatively influence the development of a trusting therapeutic relationship
Q72	I believe that digital tools hinder the development of a genuine emotional connection during therapy sessions
Q73	I believe that the use of digital tools limits the interpretation of non-verbal cues
Q74	I believe that the lack of non-verbal cues negatively impact the ability of psychologists to make accurate observations
Q75	I believe that digital tools provide clear information about how personal and future client data will be used and stored
Q76	Please select “strongly disagree” for this statement

Q77	I believe that digital-mediated tools such as videoconferences and emails facilitate clear and effective communication between therapists and clients

Appendix B

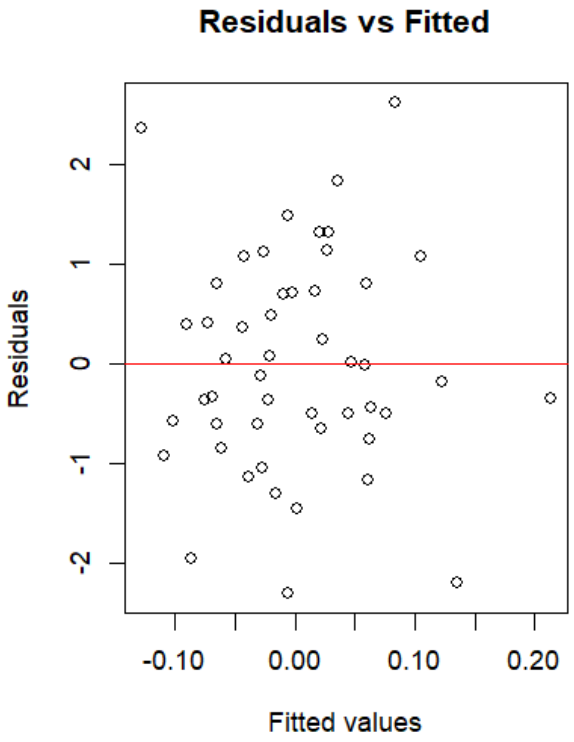
Assumption check

After conducting a linear model regression analysis with *Willingness* being the dependent variable and *Risks of Client Interaction* and *Benefits of Client Interaction* as independent variables, and *Digital Literacy* as a control variable, the assumptions were tested.

Linearity was the first assumption that was assessed through plotting the residuals against the fitted plot. As seen in Figure 3, no curve can be detected indicating linearity, meaning that all values are scattered around 0 with a few outliers.

Figure 3

Linearity Check Plot (Residuals vs. Fitted values)

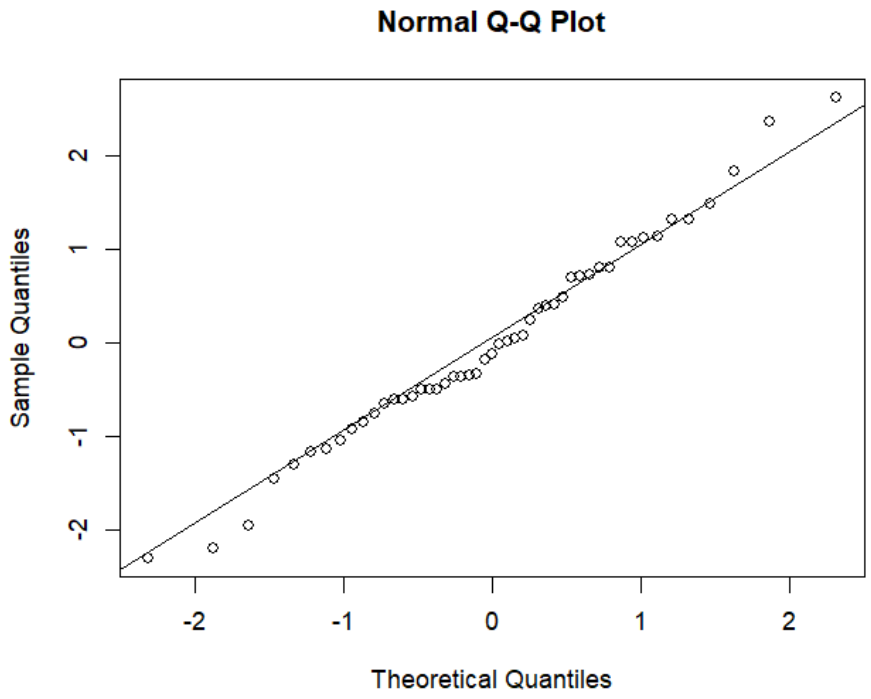


Normality is the second assumption that was assessed through the usage of a Q-Q Plot and the Shapiro-Wilk test for each independent variable. The Q-Q-Plot indicates that the values fall mostly on the line of normality, with some slight scattering around the tails,

indicating that the assumption could be met (Figure 4). Furthermore, when conducting the Shapiro-Wilk test the results state the data was approximately normally distributed, because the p-value is significantly higher than $p < 0.05$ ($p = 0.875$) and the W-statistic lies around 0.99. Looking at solely the W-statistic it would indicate that since the number is closer to 1, that the data matches a better fit to a normal distribution, since the Q-Q Plot indicates the same, meaning that the assumption of Normality is met, and the residuals are approximately normal.

Figure 4

Q-Q Normality Plot for Linear Model Regression Analysis



Following Normality, Homoscedasticity was assessed through conducting the Breusch-Pagan test. The results report a test statistic of $\chi^2(3) = 2.02$ and $p = 0.57$. Therefore, the assumption of Homoscedasticity was met, meaning that the regression results present that

the results variance is constant. As prevention for non-constant variance, robust standard errors (HC1) were applied to the linear regression model in order to adjust for potential appearing non-constant variance.

The fourth assumption concerns Multicollinearity, which was assessed through the Variance Inflation Factor (VIF) for each independent variable, namely *Benefits of Client Interaction* and *Risks of Client Interaction*, as well as the control variable *Digital Literacy*. The result for both independent variables are similar (1.05, 1.04) indicating that there is no multicollinearity between the predictors, since they are below the threshold of 10 (Bayman et al., 2021) (Table 7). Moreover, a correlational matrix was conducted to further assess the assumption about potential multicollinearity between the variables. Figure 5 visualises that there is no significant correlation between either of the variables, which can be identified by the low positive relationships of 0.19, 0.20 and a very low negative relationship between *Benefits of Client Interaction* and *Willingness* (-0.04).

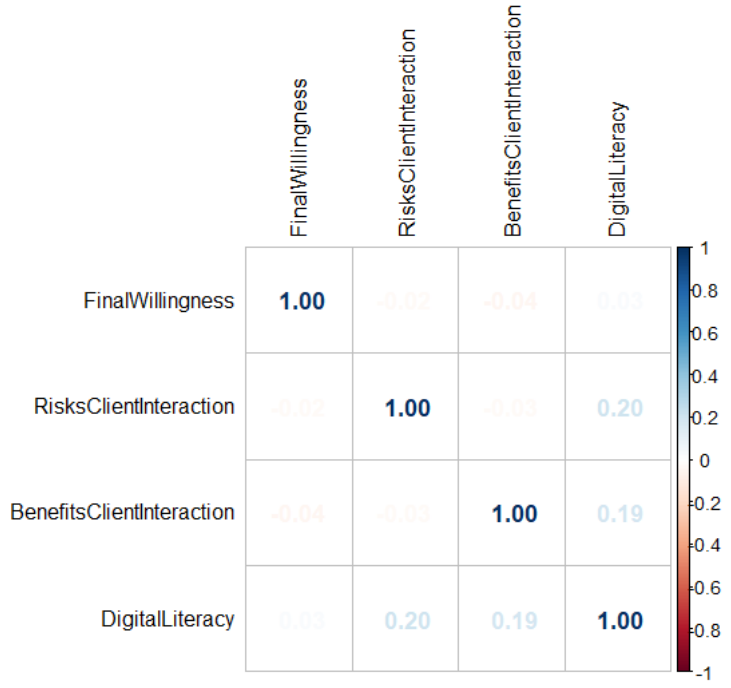
Table 7

Variance Inflation Factor for independent variables.

Test	Risks of Client Interaction	Benefits of Client Interactions	Digital Literacy
Variance Inflation Factor	1.05	1.04	1.09

Figure 5

Correlation Matrix of Willingness, Risks of Client Interaction and Benefits of Client Interaction and control variable Digital Literacy



Note: All four variables were plotted against each other. With numbers indicating the correlation.

The Levene´s Test was conducted in order to test the homogeneity of variance of each independent variable, with the results being coherently presented in Table 8. Analysing these results, it can be said that the variances of *Willingness* did not significantly differ across the groups of *Risks of Client Interaction*, F (1, 47) = 0.33 and p = .57, and *Benefits of Client Interaction*, F (1, 47) = 0.11 and p = .74, respectively. This means that the assumption of Homogeneity of variance was met, because the Levene´s test was not significant.

Table 8

Levene´s Test for Homogeneity of Variance

Variable	F value	p-value
Risks of Client Interaction Group	0.33	0.57

Benefits of Client Interaction Group	0.11	0.74

Note: The variable Risks of Client Interaction Group and Benefits of Client Interaction Group include two groups, named high and low concern.

All assumptions were met according to their assessments.