Value Congruence: A Cross-Sectional Survey Study on How Professional Values Influence Students' Value-Based Attitude of Digital Technologies in Mental Health Care

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Abstract

Background: Despite the benefits of digital technologies in mental health care, their implementation rate remains low, which is why understanding the driving factors for technology adoption is an important subject to study. Despite the focus on technology acceptance, research on how value congruence might influence favourable or unfavourable attitudes towards digital technologies was identified as a potential gap. This study examines whether professional values influence psychology students' value-based attitudes towards digital technologies in therapeutic contexts.

Method: A cross-sectional online survey was conducted among psychology and communication science students ($N = 48$). The survey included measures of demographics, digital literacy, professional values, and value-based technology attitudes. Data were analysed using exploratory factor analysis, reliability testing, correlations, and multiple regression, with digital literacy as a control variable.

Results: Exploratory factor analyses revealed three factors each for values and technology attitudes. Multiple regression analysis found that "Social Orientation" significantly predicted "Digital Opportunities for Growth and Compassionate Care" ($\beta = .41$, $p = .005$, $R^2 = .30$), while both "Integrity" ($\beta = .40$, $p = .008$) and "Social Orientation" ($\beta = .30$, $p = .039$) predicted "Digital Ethical Practice" ($R^2 = .28$). No significant predictors emerged for "Digital Challenges and Professional Concerns." The control variable digital literacy did not significantly predict any attitude dimension.

Discussion: Findings underscore the importance of value congruency in shaping positive attitudes towards digital technologies, with implications for curriculum development, ethical guidelines, and future implementation strategies in digital mental healthcare.

Value Congruence: A Cross-Sectional Survey Study on How Professional Values Influence Students' Attitude of Digital Technologies in Mental Health Care

Historically, the healthcare profession has been closely linked to innovative technology that enhances patient care and efficiency among healthcare personnel (Wouters et al., 2016; Kruse et al., 2018). In recent decades, digitalisation has enabled the development of a variety of digital technologies, aimed at improving accessibility and dissemination of health care services, including mental health services. Examples include digital therapeutics, mobile health apps, teletherapy or video therapy services and AI-chatbots, accessible via the internet (Hüter, 2024). Advancing accessibility has ultimately allowed a democratisation of health information and connectivity for therapists and clients (Wouters et al., 2016).

Therapists have pointed out the benefits that digital technologies offer to mental health care. Generally, the benefits comprise accessibility and time flexibility, highlighting the general convenience of digital technologies, which is a predictor for actual use (Braun et al., 2022; Rutkowska et al., 2023; Margherita et al., 2024; Venkatesh et al., 2003). However, students and therapists have raised concerns about technological issues, limited perception of non-verbal cues and privacy regarding video therapy (Gbollie et al., 2023; Meier et al., 2023; Rutkowska et al., 2023). Additionally, the lack of presence contributes to a weaker perceived therapeutic connection, which was reported by an international sample of 826 practising therapists (Aafjes-van Doorn et al., 2024). Despite growing efforts to implement new digital technologies into mental health care, the uptake and adoption remain rather slow (Wouters et al., 2016). Attitudes toward technology are significant predictors of technology acceptance (Rogers et al., 2014), therefore it's crucial to investigate what shapes these attitudes. Prior research on technology attitudes has largely focused on external factors, such as accessibility, usability and effectiveness, overlooking important internal factors like values.

Attitude Development

A crucial part of the implementation process is the acceptance of technology (Rogers et al. 2014). *Technology acceptance* has been coined as a term that describes "a person's positive attitude and willingness to use a new technology" and has been found to significantly predict actual use (Davies, 1989; Venkatesh et al., 2003). Theoretical frameworks like the Unified Theory of Acceptance and Use of Technology (UTAUT), the Levels of Adoption of E-mental Health (LAMH) model and the Diffusion of Innovations Theory (DOI) have been developed to explain and predict technology adoption (Venkatesh et al., 2003; Feijt et al., 2018; Rogers et al., 2014).

The UTAUT is an integration of prior technology acceptance models and includes factors like Performance Expectancy, Effort Expectancy, Social Influence, Ease of Use and several facilitating factors that predict use intention (Venkatesh et al., 2003). Venkatesh et al. found factors like age, gender, experience and voluntariness of use to mediate the effect of primary factors on the intention to use technology. Next to that, the LAMH model specifically focuses on how mental health technologies are adopted by therapists and divides them into 5 different levels of correct use: "no use, minimal use, passive use, active use and innovative use" (Feijt et al., 2018, p.7). Additionally, Feijt et al. suggest that each level is influenced by specific drivers and barriers that promote or impede shifts between technology adoption levels.

While these technology acceptance frameworks focus on the actual use of technology, Sekhon et al. (2017) proposed the Theoretical Framework of Acceptability (TFA), which highlights how acceptance of health care interventions develops before the first use. Although the framework itself does not explicitly mention technology, they suggest that affective attitude, ethicality and self-efficacy predict acceptance of mental health interventions (Sekhon et al., 2017). The Diffusion of Innovations Theory (DOI) developed by Rogers et al. (2014)

also takes the initial perception into account. DOI suggests that knowledge and persuasion precede acceptance. “Knowledge” describes awareness of the technology, knowledge of how to use it, and how it works (Rogers et al., 2014). The latter two are especially important, since they can be conceptualised as *digital literacy*, a multidimensional concept describing self-efficacy when working with technology (Reddy et al., 2020). According to Walton (2016, as cited in Reddy et al., 2020, p.83) a digital literate individual can “confidently and critically engage with digital technologies to access, assess, produce, and share information across various platforms and obtains the skills needed to effectively navigate and utilize digital tools and networks for academic, personal, and professional purposes”. Digital literacy is a predictor for general adoption and thus also affects persuasion, which determines the favourability or unfavorability of the innovation (Rogers et al., 2014). Thus, when the technology is perceived as ethical, produces a positive-affective attitude, and individual is digital literate, acceptance might be more likely (Rogers et al., 2014; Sekhon et al., 2017).

The unfavourable or favourable attitude towards technology is also influenced by factors such as compatibility, which is the congruence between the technology and the own values (Rogers et al., 2014). Given that mental health professionals have strong professional values (Packard et al., 2008), a negative attitude towards a technology could at least be partially explained by incongruence between therapists’ values and the perceived affection of technology (Edwards & Cable, 2009). Lastly, such incongruences between the technology and their values could be perceived as threatening to their professional role, which might explain slow uptake rates on an individual level, suggesting an effect of ethicality on affective attitudes (Jussupow et al., 2018; Sekhon et al., 2017).

Value Congruent Technologies

Professional values like altruism, care and patient-centeredness are uniquely found in care professions (Wouters et al., 2016). Packard et al. (2008, p. 621) investigated the

professional values of counselling psychologists and found “nine core values that are focusing on altruism, positive relationships, integration of science and practice, holistic development, respect for diversity, social justice, collaboration, and strengths-based approaches” which reflect core values and ethical principles that must be followed to practise in most countries by therapists (Packard et al., 2008; Wouters et al., 2016). Larger psychology institutions like for instance the American Psychological Association (APA), adhere to a code of conduct that comprises ethical principles which embody those professional values. In general, these ethical principles include values like beneficence, non-maleficence, integrity, respect, justice, trustworthiness, competence and responsibility for society (American Psychological Association, 2017), which align with the general values found by Packard et al. (2008) and Wouters et al. (2016).

A negative attitude towards a technology could at least be partially explained by incompatibility between therapists’ values and the perceived affection of technology, which can be described as value incongruent (Edwards & Cable, 2009). Such incongruencies between the technology and their values can be perceived as threatening to their professional role. Value incongruence between values and digital technologies can lead to *professional identity threat*, that Jussupow et al. (2018, p.7f) defines as “a perceived threat to an individual’s self-concept based on their professional role, triggered when external factors such as technological changes, organizational decisions, or shifts in professional boundaries challenge the meaning, status, competence, or autonomy associated with their profession”.

The authors distinguished between individual-directed threats like expertise and status position that are linked with individual-level resistance, and group-directed threats like professional autonomy, professional influence, and the core values of being a care provider which encourages collective resistance (Jussupow et al., 2018). Current research indeed suggests that value incongruence might negatively impact technology acceptance, leading to

slow uptake rates despite growing implementation efforts (Wouters et al., 2016; Jussupow et al., 2018).

Even though the body of research on technology acceptance among therapists is quite extensive, there have only been a few studies that focus on the role of professional values. Furthermore, how congruencies and incongruencies shape attitudes towards digital technologies in mental healthcare have not been studied before. Meier et al. (2023) showed that when psychology students had generally positive attitudes towards video therapy, they were more likely to show adoption intentions. In contrast, Jussupow et al. (2022) suggest that value incongruence leads to students exhibiting stronger identity threats compared to experienced therapists, which may result in resistance and could be essential in studying the role of attitudes. Furthermore, while undergoing education, students often have little to no experience with such technologies, since most education programs do not include digital technologies in their curriculum (Hüter, 2024). However, students might be more digital literate in general, due to the distribution of age and therefore lifelong exposure to digital technologies (Hüter, 2024) which makes them an ideal target group.

Current Study

This study aims to investigate whether professional values influence psychology students' value-based attitudes towards digital health technologies. By addressing this gap, this research aims to contribute to closing the gap between implementation effort and uptake of digital technologies in mental health care. Concludingly, the following research question can be stated: "To what extent do psychology students' professional values predict their attitudes towards digital technologies in mental healthcare?"

Methodology

Participants

The study focused on undergraduate and graduate psychology students. To increase the sample size, communication science students were included as well. Participants were excluded when enrolled in a different study programme or did not answer more five items. Recruitment of participants occurred via an online survey distributed through the university's SONA participant pool and WhatsApp. SONA is an online research management system that allows students to participate in and manage participation credits for psychological research studies, which are a requirement to graduate at the University of Twente. WhatsApp was used as an informal way of informing peers about the study by sending it into programme-specific group- or private chats. The survey was published using the online survey platform Qualtrics on the 28th of April 2025, and data collection remained open until the 30th of May 2025. Participation was voluntary and anonymous, and students eligible for SONA were granted 0.25 SONA points for their participation.

In total, 70 participants participated in the study, out of which 48 were suitable for data analysis. Age ranged from 18 to 54 years (M = 24.2, SD = 6.5). Of the 48 participants, 50% (n = 24) identified as female, 39.6% (n = 19) as male, 8.3% (n = 4) as non-binary or third gender, and 2.1% (n = 1) preferred not to disclose their gender. The majority of participants attended the University of Twente (87.5%, n = 42), while the rest were distributed among Bergische Universität Wuppertal, Leibnitz University Hannover, Breda University of Applied Sciences, Osnabrück University, Radboud University, and University of Münster (each 2.1%, n = 1). The education level was distributed between undergraduate students with 25% (n = 12) being first-year, 20.8% (n = 10) second-year, 35.4% (n = 17) third year, and 10.4% (n = 5) being fourth-year Bachelor students, graduate students with 2.1% (n = 1) third-year Master students and postgraduate students with 6.3% (n = 3) being PhD candidates. Lastly, 87.5% (n

= 42) were enrolled in psychology-related programmes, while 12.5% (n = 6) were enrolled in Communication Science programmes.

Survey Design

The study employed a cross-sectional survey design, which consisted of multiple sections. Relevant for this study were only the 4 sections: demographics, digital literacy, professional values and attitudes towards digital technologies. The items were measured on a 7-point Likert scale, and answer options ranged from "Strongly Disagree" to "Strongly Agree".

Demographics

The demographics section consisted of questions related to participant age, gender, nationality, university, year of study and study programme.

Digital Literacy

Section 2 consists of 10 closed-ended items to assess digital literacy on a 7-point Likert Scale. Items were extracted from Wardhani et al. (2019) and intended to give a precise overview of the respondents' digital literacy as a control variable.

Professional Values Scale

Section 3 comprised of 25 adapted items measuring 5 professional value dimensions: altruism, justice, integrity, professionalism and collaboration, making up the independent variable. The values were chosen as umbrella values based on existing frameworks (Valdéz et al., 2002; Packard et al., 2008; Moyo et al., 2015; Wouters et al., 2016), and items were adapted from the "Nurses Professional Values Scale-Revised" (NPVS-R), developed by Weis and Schank (2009) to fit this target group. For example, Item 18 from the NPVS-R questionnaire stated: "Provide care without bias or prejudice to patients and populations" and

was adapted to JU2: “I am committed to providing equal psychological care to all, regardless of their social identity.” (Weis & Schank, 2009).

Technology Attitude Scale

Section 4 consists of 25 adapted items that reflect attitude statements between the values dimensions from the prior questionnaire and digital technologies. Approval or disapproval with these statements measure value congruence between the 5 value dimensions and digital technologies. Some Items were reverse-scored, and item order was randomised to ensure validity and decrease response biases. For instance, Item 6 from the NPSV-R questionnaire: “Establish standards as guide for practice” has been altered to Item TAPR5_R: “I believe an overemphasis on digital tools could compromise the professional standards I aim to uphold.” (Weis & Schank, 2009). The complete questionnaire and full list of items, including all 4 sections, can be found in Table A1 in Appendix A.

Procedure

The survey was uploaded to Qualtrics and took approximately 20 minutes to complete. The study was accessible by a link to SONA for university students from the University of Twente and a Qualtrics link for students from other universities. The survey was only available in English. Following the link, participants were first presented with an informed consent form outlining the study’s purpose, voluntary nature, and data confidentiality. Only those who consented were able to proceed.

Participants were provided with instructions on how to correctly answer Likert Scale Items. After the instructions, they proceeded to Section 1, where demographic questions were presented. In section 2, participants answered questions about digital literacy. In section 3, the professional values were assessed, and in section 4, the value-based attitude of digital technologies was measured. This study was approved by the University of Twente’s BMS

Ethics Committee/ domain Humanities & Social Sciences. The survey took approximately 20 minutes to complete, and answers were saved on Qualtrics.

Data Analysis

First, a power analysis was conducted to investigate the minimum sample size. Assuming a medium effect, significance level of .05 and a power of .8, 68 participants were needed to gain a significant sample size. To perform the statistical analyses, RStudio was used. In the first step, the dataset was pre-processed. First, the validity of the entries was assessed. Entries that were missing more than 5 items or deviated from the psychology or communication science programme were excluded. Secondly, reverse-scored items were reversed, and Likert-scale answers were translated into numerical values for analysis. The independent variable was students' professional values, and the dependent variable was students' attitudes towards digital technologies. Digital literacy was added as a control variable.

After preprocessing, Demographics and descriptive statistics were calculated. The suitability of the data was assessed based on the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. Parallel analysis suggested a two-factor solution for the Value Scale; however, the scree plot (elbow criterion) indicated a three-factor model. For the Technology Attitude Scale, parallel analysis also suggested a three-factor solution. Two initial maximum likelihood EFA's with oblimin rotation were conducted to identify the underlying dimensions of the value, and the technology attitude items. Items were removed if their loading was (< .40) on all factors. Subsequently, Cronbach's alpha was calculated to ensure internal consistency. Pearson correlation between factors was assessed. Lastly, a multiple regression analysis investigated the predictive power of the professional values factors on the technology attitude factors, which were extracted from the EFA's, while accounting for digital literacy as a control variable.

Results

Value Scale

Exploratory Factor Analysis

To examine the underlying factors of the 25 items measuring professional values, an exploratory factor analysis was performed. *KMO* was 0.63, indicating a mediocre level of common variance among items. Next to that, Bartlett's test of sphericity was significant, $\chi^2(300) = 668.34$, $p < .001$, suggesting that the inter-item correlations were sufficient for factor analysis. After the first and second EFA, (AL5, JU2, IN2, JU1, IN3, CO2, CO4) had weak loadings (< .40 across all factors) and were removed. A third and final EFA was then conducted on the remaining 18 items.

The final EFA supported a three-factor solution that accounted for 54% of the total variance. Factor loadings are presented in Appendix B. Based on the pattern of factor loadings and theoretical considerations, the three factors were labelled as follows: "Integrity", "Altruism", and "Social Orientation". The "Integrity" factor included items such as IN5, IN4, IN1, and PR2, which reflected honesty, moral and ethical behaviour in practice. The "Altruism" factor was defined by high loadings on items including AL2, AL4, and AL3, representing prosocial and caring behaviour. The "Social Orientation" factor was characterised by strong loadings on JU4, CO3, and CO5, reflecting an orientation toward social norms, collaboration and social justice. After reviewing, these labels were selected to reflect the empirical grouping and conceptual distinctions from the original dimension, which align more with the underlying constructs of the items.

Cronbach's alpha was calculated for each of the three final subscales. All scales demonstrated acceptable to good internal consistency ($\alpha \geq .73$). Table 1 presents the sample size, reliability coefficients, as well as means and standard deviations.

Table 1
Internal Consistency (Cronbach's Alpha) for the Three Value Factors (N = 48)

Factor	*n*	*α*	*M*	*SD*
Integrity	48	.85	5.95	0.71
Altruism	48	.86	5.85	1.04
Social Orientation	48	.73	5.83	0.77

Note. N = number of participants; α = Cronbach's alpha; M = Mean; SD = Standard deviation.

Technology Attitude Scale

Exploratory Factor Analysis

The Kaiser-Meyer-Olkin measure of sampling adequacy indicated mediocre factorability ($KMO = 0.54$), while Bartlett's test of sphericity was significant (χ^2 (300) = 576.63, $p < .001$), suggesting that the correlation matrix was suitable for factor analysis. Based on these results and theoretical considerations, an initial three-factor exploratory factor analysis was conducted on the 25 technology attitude items using maximum likelihood extraction and oblimin rotation. Some items (TAIN3, TAJU3, TAPR2_R, and TACO4) demonstrated low communalities and weak loadings (<.40) were removed.

A second EFA on the reduced set of 21 items retained the three-factor structure. This model showed slight improvement in fit indices, including a higher Tucker Lewis Index (from 0.698 to 0.765) and a similar RMSEA (0.069 to 0.071). The cumulative variance explained increased marginally to 43%, with stable factor correlations. The root mean square residuals decreased slightly, indicating a better overall fit. Factor loadings remained interpretable, and items demonstrated acceptable communalities and complexity, supporting the refined three-factor solution after item removal. The factor loadings for every item can be found in Appendix C.

The three factors identified in the analysis represent distinct dimensions of attitudes toward digital technologies in therapy. Factor 1, labelled “Digital Ethical Practice”, reflects positive beliefs about how digital tools can enhance ethical standards, promote client-centred care, support equity and inclusion, and facilitate professional collaboration. Factor 2, “Digital Challenges and Professional Concerns”, captures worries about the potential negative impacts of technology, including threats to therapeutic relationships, confidentiality, teamwork, and equitable access. Notably, the reverse-scored items cluster under this factor, which was not expected. Finally, Factor 3, „Digital Opportunities for Growth and Compassionate Care”, highlights optimism about digital technologies as valuable resources for ongoing professional development, compassionate client support, and ethical knowledge sharing.

Table 2 presents the internal consistency estimates for the three technology attitude factors. The „Digital Opportunities for Growth and Compassionate Care” factor showed excellent reliability (α = .86), followed closely by “Digital Challenges and Professional Concerns” with strong reliability (α = .84). The “Digital Ethical Practice” scale demonstrated acceptable reliability (α = .66), although somewhat lower than the other factors. Mean scores indicate generally positive attitudes across all three dimensions, with the highest average reported for „Digital Opportunities for Growth and Compassionate Care” (M = 5.97, SD = 0.67).

Table 2

Internal Consistency (Cronbach’s Alpha) for the Three Technology Attitude Factors (N = 48)

Factor	*n*	α	*M*	*SD*
Digital Opportunities for Growth and Compassionate Care	48	.86	5.97	0.67

Factor	*n*	*α*	*M*	*SD*
Digital Challenges and Professional Concerns	48	.84	5.70	0.82
Digital Ethical Practice	48	.66	5.81	0.76

Note. *n* = number of participants; *α* = Cronbach's alpha; *M* = Mean; *SD* = Standard deviation.

Pearson Correlation

Pearson correlations revealed several significant relationships among the extracted factors of both EFAs. "Integrity" was significantly positively correlated with "Social Orientation" ($r = .31$, $p < .05$), „Digital Opportunities for Growth and Compassionate Care" ($r = .29$, $p < .05$), and "Digital Ethical Practice" ($r = .41$, $p < .01$), suggesting that individuals with higher integrity also tend to value interpersonal orientation, compassionate care, and ethical considerations in digital contexts. "Altruism" was positively related to „Digital Opportunities for Growth and Compassionate Care" ($r = .33$, $p < .05$), but showed no significant associations with the other digital-related variables. "Social Orientation" was strongly correlated with „Digital Opportunities for Growth and Compassionate Care" ($r = .47$, $p < .01$), indicating a convergence between social concern and digital opportunities around patient care. Digital outcomes, including "Digital Literacy" and "Digital Challenges and Professional Concerns", showed generally weak or non-significant associations with the core value factors, suggesting these may operate relatively independently in this sample. The full correlation matrix is shown in Table 3.

Table 3

Pearson Correlation Matrix for all extracted factors

Variable	1	2	3	4	5	6	7
1. Integrity							
2. Altruism	.21						
3. Social Orientation	.31*	.08					
4. Digital Opportunities for Growth and Compassionate Care	.29*	.33*	.47**				
5. Digital Challenges and Professional Concerns	.05	.05	-.04	-.00			
6. Digital Ethical Practice	.41**	-.04	.37	.31*	.23		
7. Digital Literacy	.23	.26	.19	.08	-.18	.06	

Note. $N = 48$. $p < .05$*, $p < .01$**.

Multiple Regression Analysis

To examine if professional values predict attitude towards technology, three multiple regression models were built. Each model tested the effect of three value-based factor scores, “Integrity”, “Altruism” and “Social Orientation” and the digital literacy composite score on one of the three technology attitude factors derived from exploratory factor analysis, “Digital Ethical Practice”, “Digital Challenges and Professional Concerns” and “Digital Opportunities for Growth and Compassionate Care”. Variance Inflation Factor (*VIF*) values were all below 1.25, indicating no issues with multicollinearity. Visual inspection of residual plots for all models suggested that assumptions of linearity, homoscedasticity, and normality were reasonably met.

Digital Opportunities for Growth and Compassionate Care

The first model (Table 4) was statistically significant, F (4, 41) = 4.38, p = .005, accounting for approximately 30% of the variance in "Digital Opportunities for Growth and Compassionate Care" scores (Adjusted R^2 = .23). Among the predictors, "Social Orientation" was a significant positive predictor, β = .43, p = .005, indicating that higher scores on this values dimension were associated with more favourable views on this aspect of technology. "Altruism" showed a trend toward significance (p = .085), while "Integrity" and digital literacy were not significant predictors. Table 4 shows the multiple regression for "Digital Opportunities for Growth and Compassionate Care".

Table 4

Multiple Regression Table of Digital Opportunities for Growth and Compassionate Care

Predictor	*B*	*SE B*	*β*	*t*	*p*
Intercept	0.90	1.22		0.74	.462
Integrity	0.11	0.14	.11	0.77	.447
Altruism	0.28	0.16	.26	1.77	.850
Social Orientation	0.43	0.14	.41	2.96	.005
Digital Literacy	-0.16	0.22	-.11	-0.75	.459

Note. B = unstandardized regression coefficient; *SE B* = standard error of *B; β* = standardised regression coefficient. $p < .05$. N = 48. F (4, 41) = 4.38, p = .005, R^2 = .30, adjusted R^2 = .23

Digital Challenges and Professional Concerns

The second model (Table 5) was not statistically significant, F (4, 41) = 0.56, p = .690, with a low amount of explained variance (Adjusted R^2 = -.04). None of the predictors reached statistical significance, suggesting that neither the value factors nor digital literacy were strong predictors of this dimension of technology attitude.

Table 5

Multiple Regression Table of Digital Challenges and Professional Concerns

Predictor	*B*	*SE B*	*β*	*t*	*p*
Intercept	1.976	1.412		1.399	.169
Integrity	0.066	0.159	.07	0.416	.680
Altruism	0.124	0.186	.11	0.668	.508
Social Orientation	-0.035	0.167	-.03	-0.211	.834
Digital Literacy	-0.348	0.249	-.23	-1.400	.169

Note. $N = 48$. $F(4, 41) = 0.56$, $p = .690$, $R^2 = .05$, adjusted $R^2 = -.04$

Digital Ethical Practice

The third model (Table 6) was significant, $F(4, 41) = 4.06$, $p = .007$, explaining about 28% of the variance in "Digital Ethical Practise" scores (Adjusted $R^2 = .21$). Two predictors were statistically significant: "Integrity" ($\beta = .37$, $p = .008$) and "Social Orientation" ($\beta = .30$, $p = .039$). This suggests that both these value dimensions are positively associated with greater ethical concern or critical reflection regarding technology, indicating that technology attitudes are influenced by the social and professional environment. "Altruism" and "Digital Literacy" were not significant predictors.

Table 6

Multiple Regression Table of Digital Ethical Practice

Predictor	*B*	*SE B*	*β*	*t*	*p*
Intercept	0.052	1.204		0.043	.966
Integrity	0.375	0.135	.40	2.772	.008
Altruism	-0.248	0.158	-.23	-1.569	.124
Social Orientation	0.304	0.143	.30	2.133	.039

Predictor	*B*	*SE B*	*β*	*t*	*p*
Digital Literacy	-0.004	0.212	< .01	-0.021	.983

Note. $N = 48$. $F(4, 41) = 4.06$, $p = .007$, $R^2 = .28$, adjusted $R^2 = .21$

Discussion

This study aimed to examine the influence of psychology students' professional values and their technology attitudes in clinical and counselling practice. Additionally, digital literacy was measured as a control variable. Findings were meant to contribute to extending the body of research on drivers and barriers of technology adoption in an underrepresented stakeholder group, like psychology students or future psychologists. Multiple regression models revealed that "Social Orientation" significantly predicted „Digital Opportunities for Growth and Compassionate Care", which suggests that students who prioritise collaborating, inclusive behaviour and social justice tend to view digital tools as facilitators of compassionate, client-centred care (Packard, 2008; Wouters et al., 2016). Additionally, "Integrity" and "Social Orientation" significantly predicted "Digital Ethical Practice", indicating that students who embody professional and social values, norms, and ethical principles also engage more with respective digital tools, if they are considered useful and congruent (Jussupow et al., 2018, 2022; Sheikh et al., 2023).

In contrast, no value factors predicted "Digital Challenges and Professional Concerns", which might be due to the reverse-scored items clustering all in this factor. According to Weijters et al. (2013), this phenomenon can be defined as a method factor and leads to a response bias, which results in a distinct factor without predictive power. Digital Literacy itself did not significantly predict any technology attitude dimension, which was unexpected due to its conceptual relevance in prior research (Wardhani et al., 2019; Feijt et al., 2023) and might be due to the inclusion of too general digital literacy items, which might be due to its multidimensional conceptualisation (Reddy et al., 2020).

Value congruence

The findings that "Social Orientation" predicts „Digital Opportunities for Growth and Compassionate Care" align with Roger's (2014) compatibility factor. It suggests that students, whose professional values align with the relative benefit of a digital technology, are more likely to perceive its implementation as a relative advantage based on a favourable attitude towards it. Additionally, students may perceive some digital tools as a tool to promote social justice (Gbollie et al., 2023). This is also consistent with Feijt et al. (2023), who reported that practitioners who value equal access tend to be early adopters of e-mental health tools. "Altruism" showed a similar trend but was not significant, which could also be due to limited power or overlap between constructs. This relationship highlights the social influence, which was already captured in prior models like the UTAUT (AlQudah et al., 2021). Hüter (2024) mentioned the social environment as a strong predictor for learning about digital technologies in the mental healthcare profession, which is also connected to digital literacy and illustrates how intertwined values and attitudes are.

"Integrity" predicted "Digital Ethical Practice", which suggests professional values are shaped by practice and embodied by students already. These findings align with Jussupow et al. (2018, 2022), pointing out that students who are particularly conscientious about honesty and transparency may feel obligated to resist digital technology to restore ethical standards (Sheikh et al., 2023). Therefore, if professional values like competence and autonomy are threatened, there might be more ethical assessment towards a digital technology. This also resonates with previous research that suggests that psychotherapists with strong personal morality are more sensitive to data-security concerns in teletherapy (Gbollie et al., 2023; Meier et al., 2023; Rutkowska et al., 2023). In general, adherence to ethical practices is not new. The codes of conduct from major psychology institutions all include integrity in some way. The ethical assessment of these digital technologies is an important contribution to the

profession and will help formulate regulations and guidelines regarding the use and implementation in the future.

"Digital Challenges and Concerns" was not related to any other factor, which suggests that there wasn't any underlying construct that this research would benefit from. The method factor that played a significant role here suggests that the reverse scoring of survey items was counterproductive and enhanced response bias instead of diminishing it (Weijters et al., 2013). Findings also suggested that Digital Literacy did not predict any attitude factor and was therefore insufficient as a control variable, which was unexpected. Prior research has pointed out the role of digital literacy in how new technology is perceived and how it facilitates its use and perceived usefulness (AlQudah et al., 2021; Feijt et al., 2023). Alternatively, Digital Literacy as a concept might be distinct from the theoretical professional value construct, which might outweigh mere familiarity with technology when forming attitudes about digital ethics or growth potential (Greenhalgh et al., 2017; Yang et al., 2024). Therefore, a student could be very comfortable with Word, Zoom, and mental-health apps, yet still worry that these same tools could be incongruent with professional values in the clinical context. Nevertheless, Digital Literacy is still an important concept regarding the operationalisation of professional values and is deeply rooted in technology acceptance theory.

Limitations

Since the minimum requirements for participation were not reached, the power analysis suggests that the sample size is insufficient and the generalizability of the results is therefore limited (Cohen, 1992). Additionally, the factor "Digital Challenges and Professional Concerns" showed a method effect, which might suggest a poor survey design (Weijters et al., 2013). The initial dimensions that were extracted from various papers were also not found to

be significant, with the EFAs suggesting 3-factor solutions and items not clustering in their intended value dimension.

External validity is limited due to the inclusion of communication science students, who could pursue a career in counselling, but do not learn about psychology-specific values or technology. Furthermore, 87.5% of participants were students from the University of Twente, which does not show a significant range of university programmes but instead highlights how technology is included in the curriculum of this specific university, which might indicate a sampling bias.

Directions for Future Research

This research suggests that congruence between values and digital technologies plays an important role in influencing the affective attitude which leads to a favourable or unfavourable attitude that contributes to technology acceptance or resistance. While the significant role of technology acceptance research in understanding how humans choose to work with different technologies is indisputable, future research could further investigate the role of value congruence on technology acceptance. Value congruencies have been shown to predict technology acceptance at least somewhat (Nieboer et al., 2014) and could be further explored by larger samples and quantitative methods to increase generalizability and help improve implementation efforts in a vast digitalising field like mental health care. Various technology acceptance frameworks like the UTAUT (AlQudah et al., 2021) and the LAMH model (Feijt et al., 2018) already offer great insight into the underlying factors that determine technology acceptance and could potentially integrate value to increase the explained variance. Investigating the role of values and value formation among students could also offer great insight into how values are shaped, how students are being educated about technology and how technology can be used to facilitate the mental health care profession, without causing value incongruencies. Therefore, it would be crucial to extend validated surveys and

examine value dimensions which exceed the scope of this study to gain a broad understanding of how different values connect to different types of digital technologies and corresponding concerns.

Practical Implications

To close the gap between value-congruent technologies and hesitant adopters, information campaigns and proper education are key factors in supporting technology adoption. Multiple studies have put emphasis on the importance of information and education for students. Jussupow et al. (2018, 2022) have pointed out that education can diminish Professional Identity Threat and Hüter (2024) suggests that AFI (Acceptance Facilitating Interventions) are needed to inform university students about the benefits of certain technologies within the realm of their profession. Universities should offer courses on digital mental health care technologies or implement them into their curriculum to help support implementation and help students to be able to critically and ethically assess the use of digital technologies. Furthermore, Institutions like the APA could integrate ethical guidelines regarding technology usage into their code of conduct to offer guidelines and secure digital confidentiality, data security and access equity.

Conclusion

This study underscores that professional value dimensions play a critical role in shaping the way how psychology students perceive digital technologies in the field of mental health care. Three value dimensions were examined, namely “Integrity”, “Altruism”, and “Social Orientation”, which displayed predictive power and positively correlated with positive attitudes towards the use of digital technologies in future practice. Students who valued access, equity, collaboration and social influence were more inclined to view digital technologies as a beneficial and innovative solution. Conversely, concerns about relational distance and professional challenges remain a shared baseline not easily explained by

individual differences in professional values. The lack of predictive power of digital literacy suggests that digital technologies can be very different from one another and that proficiency with one does not imply proficiency with all of them. For educators and policymakers, these insights advocate for curricula that combine ethical considerations, value congruence, and practical technology training so that future therapists can embrace digital innovation without compromising the foundation of professional integrity and social justice, which is shared professional values.

References

Aafjes-Van Doorn, K. (2022). The complexity of teletherapy: Not better or worse, but different. *Clinical Psychology Science and Practice*, *29*(2), 182–184. https://doi.org/10.1037/cps0000073

American Psychological Association. (2017). Ethical principles of psychologists and code of conduct (2002, amended effective June 1, 2010, and January 1, 2017). https://www.apa.org/ethics/code

AlQudah, A. A., Al-Emran, M., & Shaalan, K. (2021). Technology Acceptance in Healthcare: A Systematic review. *Applied Sciences*, *11*(22), 10537. https://doi.org/10.3390/app112210537

Braun, P., Drüge, M., Hennemann, S., Nitsch, F. J., Staeck, R., & Apolinário-Hagen, J. (2022). Acceptance of E-Mental health services for different application purposes among psychotherapists in clinical training in Germany and Switzerland: Secondary analysis of a Cross-Sectional survey. *Frontiers in Digital Health*, *4*. https://doi.org/10.3389/fdgth.2022.840869

Cohen, J. (1992). Statistical Power analysis. *Current Directions in Psychological Science*, *1*(3), 98–101. https://doi.org/10.1111/1467-8721.ep10768783

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Edwards, J. R., & Cable, D. M. (2009). The value of value congruence. *Journal of Applied Psychology*, *94*(3), 654–677. https://doi.org/10.1037/a0014891

Feijt, M. A., De Kort, Y. A., Bongers, I. M., & IJsselsteijn, W. A. (2018). Perceived Drivers and Barriers to the adoption of eMental Health by Psychologists: The construction of the levels of adoption of eMental Health Model. *Journal of Medical Internet Research*, *20*(4), e153. https://doi.org/10.2196/jmir.9485

Feijt, M., De Kort, Y., Westerink, J., Bierbooms, J., Bongers, I., & IJsselsteijn, W. (2023). Integrating technology in mental healthcare practice: A repeated cross-sectional survey study on professionals' adoption of Digital Mental Health before and during COVID-19. *Frontiers in Psychiatry*, *13*. https://doi.org/10.3389/fpsyt.2022.1040023

Gbollie, E. F., Bantjes, J., Jarvis, L., Swandevelder, S., Du Plessis, J., Shadwell, R., Davids, C., Gerber, R., Holland, N., & Hunt, X. (2023). Intention to use digital mental health solutions: A cross-sectional survey of university students attitudes and perceptions toward online therapy, mental health apps, and chatbots. *Digital Health*, *9*. https://doi.org/10.1177/20552076231216559

Greenhalgh, T., Wherton, J., Papoutsi, C., Lynch, J., Hughes, G., A'Court, C., Hinder, S., Fahy, N., Procter, R., & Shaw, S. (2017). Beyond Adoption: a new framework for theorizing and evaluating nonadoption, abandonment, and challenges to the Scale-Up, spread, and sustainability of health and care technologies. *Journal of Medical Internet Research*, *19*(11), e367. https://doi.org/10.2196/jmir.8775

Hüter, P. (2024). *How to increase acceptance of digital mental health services among students and future healthcare providers?* [Doctoral dissertation, Heinrich Heine University Düsseldorf]. Heinrich Heine University Düsseldorf Repository. Retrieved from https://docserv.uni-duesseldorf.de/servlets/DocumentServlet?id=67199

Jussupow, E., Spohrer, K., & Heinzl, A. (2022). Identity threats as a reason for resistance to artificial intelligence: Survey study with medical students and professionals. *JMIR Formative Research*, *6*(3), e28750. https://doi.org/10.2196/28750

Jussupow, E., Link, C., Spohrer, K., & Heinzl, A. (2018). Conceptualizing Professional Identity Threats from Information Technology [Completed Research Paper]. In University of Mannheim, *Thirty Ninth International Conference on Information Systems, San Francisco 2018* (pp. 1–6). University of Mannheim. https://www.researchgate.net/publication/331716077

Kruse, C. S., Karem, P., Shifflett, K., Vegi, L., Ravi, K., & Brooks, M. (2016). Evaluating barriers to adopting telemedicine worldwide: A systematic review. *Journal of Telemedicine and Telecare*, *24*(1), 4–12. https://doi.org/10.1177/1357633x16674087

Margherita, G., Caffieri, A., & De Maio, N. (2023). When the algorithm 'matches' us: The experiences of early-career psychologists on online platform services for psychotherapy and counselling in Italy. *Counselling and Psychotherapy Research*, *24*(2), 666–680. https://doi.org/10.1002/capr.12704

Meier, J. V., Noel, J. A., & Kaspar, K. (2023). Understanding psychology students' perspective on video psychotherapy and their intention to offer it after graduation: a mixed-methods study. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1234167

Moyo, M., Goodyear-Smith, F. A., Weller, J., Robb, G., & Shulruf, B. (2015). Healthcare practitioners' personal and professional values. *Advances in Health Sciences Education*, *21*(2), 257–286. https://doi.org/10.1007/s10459-015-9626-9

Nieboer, M., Van Hoof, J., Van Hout, A., Aarts, S., & Wouters, E. (2014). Professional values, technology and future health care: The view of health care professionals in The Netherlands. *Technology in Society*, *39*, 10–17. https://doi.org/10.1016/j.techsoc.2014.05.003

Packard, T. (2008). The 2008 Leona Tyler Award address. *The Counseling Psychologist*, *37*(4), 610–624. https://doi.org/10.1177/0011000009333986

Reddy, P., Sharma, B., & Chaudhary, K. (2020). Digital Literacy. *International Journal of Technoethics*, *11*(2), 65–94. https://doi.org/10.4018/ijt.20200701.oa1

Rutkowska, E., Furmańska, J., Lane, H., Marques, C. C., Martins, M. J., Sahar, N. U., Meixner, J., Tullio, V., Argo, A., & Barros, D. M. B. (2023). Determinants of psychotherapists' attitudes to online psychotherapy. *Frontiers in Psychiatry*, *14*. https://doi.org/10.3389/fpsyt.2023.1196907

Rogers, E. M., Singhal, A., & Quinlan, M. M. (2014). Diffusion of innovations. In *An integrated approach to communication theory and research* (pp. 432-448). Routledge.

Sekhon, M., Cartwright, M., & Francis, J. J. (2017). Acceptability of healthcare interventions: an overview of reviews and development of a theoretical framework. *BMC Health Services Research*, *17*(1). https://doi.org/10.1186/s12913-017-2031-8

Sheikh, H., Prins, C., & Schrijvers, E. (2023). Artificial intelligence: definition and background. In *Research for policy* (pp. 15–41). https://doi.org/10.1007/978-3-031-21448-6_2

Valdés, L. S., Prilleltensky, I., Walsh-Bowers, R., & Rossiter, A. (2002). Applied Ethics in Mental Health in Cuba: Part I-Guiding Concepts and Values. *Ethics & Behavior*, *12*(3), 223–242. https://doi.org/10.1207/s15327019eb1203_2

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478.

Wardhani, D., Hesti, S., & Dwityas, N. A. (2019). Digital Literacy: A Survey Level Digital Literacy Competence among University Students in Jakarta. *International Journal of English Literature and Social Sciences*, *4*(4), 1131–1138. https://doi.org/10.22161/ijels.4434

Weijters, B., Baumgartner, H., & Schillewaert, N. (2013). Reversed item bias: An integrative model. *Psychological Methods*, *18*(3), 320–334. https://doi.org/10.1037/a0032121

Weis, D., & Schank, M. J. (2009). Development and Psychometric Evaluation of the Nurses Professional Values Scale—Revised. *Journal of Nursing Measurement*, *17*(3), 221–231. https://doi.org/10.1891/1061-3749.17.3.221

Wouters, E. J. M., Weijers, T. C. M., & Nieboer, M. E. (2016). Professional values: the use of technology and the new generation of clinicians. In *Springer eBooks* (pp. 147–154). https://doi.org/10.1007/978-3-319-01583-5_51

Yang, Y., Ngai, E. W., & Wang, L. (2024). Resistance to artificial intelligence in health care: Literature review, conceptual framework, and research agenda. *Information & Management*, *61*(4), 103961. https://doi.org/10.1016/j.im.2024.103961

Appendices

Appendix A

Survey Items with Corresponding Codes

Code	Item
D1	What is your age?
D2	What is your gender
D3	At which institution do you study
D4	What is your current year of study?
D5	What study program are you enrolled in? (e.g. Psychology)
D6	What is your nationality?
DL1	Which of the following Technologies are you acquainted with?
DL2	How well do you think you can use or handle the following technologies from 1 (not at all) to 5 (very well)?
DL3	How often do you use the following technologies from 1 (never) to 5 (a lot)?
DL4	To what extent do you think the following technologies are useful for psychotherapy from 1 (not useful) to 5 (very useful)?
DL5	I can tell the difference between trustworthy and untrustworthy sources of information online.
DL6	I know how to recognize fake news, hoaxes, or biased opinions when reading content online.
DL7	I can find and use information from different websites to help with school assignments.
AC1	Please select Strongly Disagree here.
DL8	I know how to give credit to the original sources when I use information from the internet.
DL9	I know how to give credit to the original sources when I use information from the internet.
DL10	I can create digital content like images, music, or videos using online tools or apps.
DL11	I understand the difference between personal websites and official sources.
DL12	I know which information is safe to share online and what should be kept private.
DL13	I think carefully before I comment or interact with others on websites or social media.
DL14	I feel confident using digital tools like Microsoft Office or Google Docs for schoolwork.
DL15	I try to balance my time between using digital devices and doing offline activities.
AL1	I believe that showing empathy is essential in building trust with future clients.
AL2	I intend to treat every client with respect, regardless of their background or behavior.
AL3	Providing patient-centered care will be a core part of my clinical practice.
AL4	I see relational care (beyond symptom treatment) as vital in psychological work.
AL5	I feel a personal responsibility to support the wellbeing of my clients beyond clinical outcomes.
JU1	Advocating for marginalized or vulnerable clients will be part of my professional role.
JU2	I am committed to providing equal psychological care to all, regardless of their social identity.
JU3	I believe clinical psychologists should actively challenge social injustice affecting mental health.
JU4	It is important for me to create an inclusive therapeutic environment for clients from diverse backgrounds.
JU5	I see addressing systemic inequalities as part of ethical psychological practice.
AC2	Please select Strongly Agree here.
IN1	I want to maintain honesty and transparency in my relationships with clients.
IN2	Acting in alignment with ethical principles will guide my professional decisions.
IN3	I will commit to professional boundaries even in challenging situations.
IN4	Authenticity in how I present myself as a psychologist is important to me.
IN5	I value self-respect and personal accountability in my future clinical work.
PR1	I intend to use evidence-based interventions in my future clinical practice.
PR2	I want to develop expertise in specialized therapeutic approaches.
PR3	Critical thinking will be a key skill I apply when working with clients.
PR4	I see lifelong learning and professional development as essential for being a psychologist.
PR5	I believe psychologists should base their practice on scientific research and validated methods.
CO1	I look forward to collaborating with other professionals (e.g., doctors, social workers) in client care.
CO2	I believe sharing knowledge with colleagues strengthens clinical practice.
CO3	Working effectively in a multidisciplinary team will be essential in my future role.
CO4	I value solidarity and mutual support within the psychological profession.
CO5	I see teamwork as crucial in achieving the best outcomes for clients.

TAAL1	I believe digital technologies can support compassionate care by helping me respond more attentively to clients' needs.
TAIN2_R	I feel that using digital technologies in therapy challenges my ability to remain authentic with clients.
TAJU5_R	I'm sceptical that digital technologies can fairly meet the needs of clients from different cultural or socioeconomic backgrounds.
TAPR3	I see digital technologies as an opportunity for ongoing professional growth and learning.
TACO2_R	I worry that the use of digital platforms reduces spontaneous team communication and mutual support.
TAJU3	Advocating for equitable digital access is part of how I see myself promoting justice in my future role.
TAIN3	Maintaining professional integrity includes ensuring digital security and confidentiality for clients.
TACO5_R	I'm concerned that digital technologies create distance between professionals and weaken collaboration.
TAPR1	Integrating digital technologies into therapy reflects my commitment to evidence-based, evolving practices.
TAAL4_R	I worry that digital technologies interfere with building meaningful therapeutic relationships. (R)
TAJU1	I believe digital technologies have the potential to reduce inequalities in access to psychological services.
TAPR5_R	I believe an overemphasis on digital tools could compromise the professional standards I aim to uphold.
TAIN4_R	I am concerned that digital platforms make it harder to uphold proper boundaries in therapeutic relationships.
TAAL5	Using digital technologies in therapy can extend care to people who might otherwise not seek help, which aligns with my desire to help others.
TACO3	Sharing clinical insights through digital tools is something I see as part of ethical and collaborative practice.
TAPR4	Using digital platforms allows me to practice psychology in a way that aligns with modern scientific standards.
TAJU2_R	It concerns me that some clients may be excluded from care because they lack access to digital technologies.
TAAL3	I see digital technologies as tools that can enhance my ability to offer client-centred care.
TAIN1	Upholding ethical standards is important to me, and I believe digital technologies can support that when used responsibly.
TACO1	I believe digital technologies make it easier to collaborate with professionals across disciplines.
TAPR2_R	I worry that relying on digital tools could reduce the depth of critical thinking in clinical decisions.
TAJU4	Digital technologies can be a powerful way to include diverse clients who face structural barriers to care.
TAAL2_R	Respecting the individuality of clients feels more difficult when therapy is delivered through digital technologies.
TACO4	Solidarity within the mental health field can be strengthened through well-designed digital platforms.
TAIN5	I believe technology can support honest and transparent communication with clients, which aligns with my values.

Appendix B

Factor Loadings from EFA for Value Scale (N = 48).

Item	Integrity	Altruism	Social Orientation	Communality (h^2)
AL1		.72		.60
AL2		.89		.81
AL3		.66		.68
AL4		.84		.71
JU4			.55	.44
IN1	.51			.38
IN4	.73			.69
IN5	1.00			.97
PR1	.44		.42	.48
PR2	.53			.30
PR3	.46			.36
PR4	.40			.39
PR5	.45		.38	.44
CO3			.74	.52
CO5			.62	.41

Note. *Loadings < .30 are suppressed. Rotation method = Oblimin. Extraction method = Maximum Likelihood.*

Appendix C

Factor Loadings from EFA for Technology Attitude Scale (N = 48).

Item	Digital Opportunities for Growth and Compassionate Care	Digital Challenges and Professional Concerns	Digital Ethical Practice	Communality (h^2)
TPJU4	.84			.72
TPPR4	.69			.57
TPIN5	.68			.45
TPAL3	.58			.40
TPJU1	.46			.20
TPIN1	.38			.23
TPPR1	.38			.29
TPAL5	.33		.32	.28
TPIN2_R		.77		.61
TPAL4_R		.72		.51
TPCO2_R		.65		.47
TPIN4_R		.64	.33	.60
TPCO5_R		.62		.42
TPJU5_R		.51		.33
TPPR5_R		.41		.25
TPAL2_R		.45		.23
TPJU2_R		.35		.32
TPPR3			.90	.87
TPAL1			.67	.43
TPCO1	.39		.48	.52
TPCO3			.44	.30

Note. *Loadings < .30 are suppressed. Factor 1 = "Ethical Innovation and Inclusive Practice", Factor 2 = "Relational Concerns and Caution", Factor 3 = "Professional Growth and Standards". Rotation method = Oblimin. Extraction method = Maximum Likelihood.*