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Motives for becoming a teacher in times of digital change: Development and validation of the (D)FIT-Choice scale

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Abstract
This research paper introduces the (D)FIT-Choice (Digital Factors Influencing Teacher Choice) scale and discusses the outcomes of its initial implementation. The (D)FIT-Choice scale expands upon the existing FIT-Choice scale by incorporating additional subscales, namely "Prior digital technology use in education" within Socialization Influences, "Perceived digital teaching competence" within Self-perceptions, and "Contribute to the digital transformation" within Social Utility Value. "Intrinsic value subject" has also been incorporated within Intrinsic Value, and other items have been improved. By administering the (D)FIT-Choice scale to a sample of 506 student teachers, its validity and reliability as an assessment tool were established. The results indicate that digital factors are not prominent drivers for individuals choosing to pursue a career in teaching. Instead, higher levels of digital motivation are associated with the practical benefits of the job rather than with teaching-related intentions. These findings hold implications for teacher training, emphasizing the importance of understanding student teachers' motivations concerning digital technology and adequately preparing future educators for the present and future digital educational landscape.

Keywords Career choice · (D)FIT-Choice · FIT-Choice · Digital transformation · Student teachers · Teacher education

1 Introduction

The digital transformation of education is causing significant changes to teaching practices and to the profession as a whole (Iivari et al., 2020; Leahy et al., 2019; Voogt et al., 2013). Digital technologies are frequently used as teaching tools and

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also influence the subjects that are taught. According to the Swiss curricula, all teachers are supposed to teach computer and information literacy either as an independent subject or as integrated into other subjects. The culture of teaching and learning is also changing, for example, schools are moving from instruction-centric to student-centric forms of teaching and learning in which students explore and solve tasks by using digital technologies (Walkington & Bernacki, 2020; Xie et al., 2019). It remains to be seen whether recent changes in the evolution of artificial intelligence and large language models will affect the teaching profession more profoundly (Baidoo-Anu & Owusu Ansah, 2023; Kasneci et al., 2023).

Teachers play a crucial role in the digital transformation of education. Most technology integration models emphasize teachers' skills, beliefs and attitudes as the most important factors of technology uptake in teaching (Davies & West, 2014; Niederhauser & Lindstrom, 2018; Tondeur et al., 2017). Relevant skill-related factors for adapting and enhancing teaching practices include general digital competence (Fernández-Batanero et al., 2022; Starkey, 2020; Zhao et al., 2021), subject-specific technological pedagogical content knowledge (TPACK; Koehler & Mishra, 2009) and transformative digital agency (Fransson et al., 2019; Lund & Vestøl, 2020). Many studies have examined the impact of these core factors of digital transformation on digital teaching and learning practices, with both in-service and pre-service teachers. However, relatively few studies have analysed their impact on why young people choose a teaching career in the first place. Thus, it remains unclear whether prospective teachers, particularly student teachers, are adequately considering the implications of digital transformation and their responsibilities in the digital shift when beginning their careers.

In order to better plan and design teacher education curricula, predict future success, burnout and career optimism, it is useful to know the factors that influence teaching as a career choice (McLean et al., 2019; Watt & Richardson, 2007). In the context of digital transformation in education, it is crucial to determine whether the motivations of student teachers align with the expectations placed upon them. Understanding whether student teachers are motivated to embrace and drive digital transformation in their practice is essential to ensure that they are equipped to meet the evolving demands of the digital era.

1.1 General factors influencing teaching career choice

There are extrinsic and intrinsic motives for choosing a teaching career (Keller-Schneider et al., 2018; Kyriacou & Coulthard, 2000; Thomson et al., 2012; Tillmann et al., 2020). Although extrinsic factors, such as job security and salary, are important, student teachers' career choice can be mainly attributed to intrinsic factors such as positive prior teaching and learning experiences, the extent to which they enjoy and perceive themselves as being good at teaching, and how far they can realise personal and societal benefits from the job (Bergmark et al., 2018; Fray & Gore, 2018; Watt et al., 2012). Intrinsic motives seem to be higher in teaching than in other professions (Gubler et al., 2020). However, most studies

predate the current era of digital change in schools and have not investigated digital aspects that prospective teachers might consider.

The FIT-Choice scale (Factors Influencing Teacher Choice) is one of the most frequently used and most comprehensive scales for reliable and consistent assessment of the reasons for student teacher career choice (Navarro-Asencio et al., 2021; Watt & Richardson, 2007). It is based on expectancy-value theory (Wigfield & Eccles, 2000), which considers values and expectancy beliefs as the two main factors that predict choices and behaviours. The aspects included in the FIT-Choice scale are depicted in Fig. 1 (along with additions in this study). Examples of other questionnaires that go beyond the FIT-Choice scale are STeaM (Student Teachers' Motives; Keller-Schneider et al., 2018) and FEMOLA (Motivation for Choosing Teacher Education—in German, Fragebogen zur Erfassung der Motivation für die Wahl des Lehramtsstudiums; Pohlmann & Möller, 2010), integrating enjoyment of teaching specific subjects. However, none of these instruments consider digital aspects of teaching.

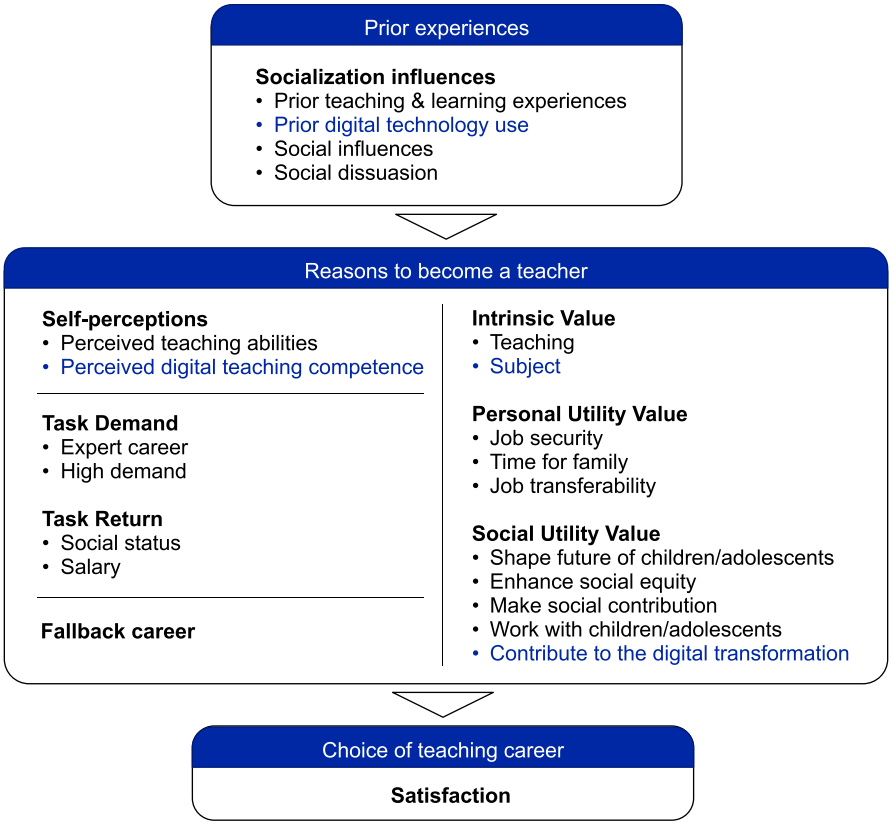

Fig. 1 Theoretical (D)FIT-Choice model (Digital Factors Influencing Teacher Choice; now empirically validated, new factors highlighted in blue)

1.2 Digital factors influencing teaching career choice

While teaching is considered a profession that is unlikely to be replaced by technology in the near future, technological changes can affect what teachers will do and whether it is considered an attractive career choice (Frey & Osborne, 2017). It is important to ascertain if the factors influencing student teachers align with the changing requirements of the profession in the digital era. Very few studies have explored this question. Rana et al. (2021) analysed teachers' motivations for teaching in virtual settings and found that important factors are learning a new technology and seeing future growth and opportunities. Rowston et al. (2022) analysed case studies of career changers and found that teachers are keen to share their technological experiences from their previous occupations in classrooms. However, there is a lack of understanding about the digital factors that influence student teachers' decisions to become teachers in general settings. Given the ongoing efforts to align education with the demands of a digital society, it is crucial to investigate three key aspects in the decision to pursue a teaching career: experiences with digital tools in education, perceived teaching ability, and social contribution (Beardsley et al., 2021; Hobbs & Tuzel, 2017; Tondeur et al., 2017).

First, while the influence of prior teaching and learning experiences on the decision to become a teacher is well-established (See et al., 2022), it remains unexplored if experiences with digital tools in education also influence this decision. As today's student teachers are often considered digital natives, it is possible that their educational experiences with technology may affect their willingness to pursue a teaching career in the digital era. This aspect deserves further investigation to better understand the relationship between digital experiences and the motivation to become a teacher.

Second, although the role of perceived teaching ability is a significant factor in motivation to enter the profession (See et al., 2022), it is not clear whether self-perceived levels of digital teaching competence also influence this decision as well as they influence the decision to use technology in the classroom (Petko, 2012). Digital competence is now a requirement for educators and therefore it is important to investigate whether prospective teachers also consider their digital teaching competence when deciding to pursue a teaching career.

Third, the aspect of social contribution, which is often cited as a significant motivator for becoming a teacher, has not been examined in the context of digital transformation. It remains unclear whether the desire to promote social equity is connected to the potential of digital tools to facilitate this, or whether the aspiration to shape the future of children and adolescents is associated with a willingness to prepare them for life in a digital society (Huda et al., 2017; Iivari, 2020). Understanding the relationship between social motivation and digital transformation could provide insights into how prospective teachers perceive the role of digital tools in addressing social issues and preparing students for the demands of a digitalized world.

1.3 Current study

In response to the limited understanding of student teachers' motivations to become teachers in the context of digital transformation in education, we have developed the (D)FIT-Choice model (Digital Factors Influencing Teacher Choice). This model extends the existing FIT-Choice scale by incorporating digital-related items. Specifically, three new factors were added to the scale as part of existing higher order factors: (1) Prior digital technology use in education, as part of Socialization Influences; (2) Perceived digital teaching competence, as part of Self-perceptions; (3) Digital transformation, as part of Social Utility Value. These additions aim to capture the digital aspects of motivations and provide a more comprehensive framework for investigating decision-making processes in relation to the digital transformation of education.

Given that prospective teachers can be motivated to enter the profession because of an interest in subject matters (Keller-Schneider, 2019; Keller-Schneider et al., 2018), a new scale for assessing the intrinsic value that student teachers perceive from the subject they teach was also added, namely, Intrinsic value subject. This addition is particularly relevant for secondary education trainees who have chosen to become teachers in specific disciplines.

The (D)FIT-Choice theoretical model shown in Fig. 1 includes these newly developed factors. The model has three main parts: Prior experiences, Reasons to become a teacher, and Choice of teaching career.

This study aims to test and validate the (D)FIT-Choice model. As there is a theoretical gap in understanding how digital factors influence teacher choice, the relative importance and position of digital-related aspects, compared to other factors in shaping the decision to become a teacher, will be investigated. The correlations between the digital-related items among them and with other variables will be explored. It will also be interesting to test whether Contribute to the digital transformation can be explained by other variables including Prior digital technology use and Perceived digital teaching competence. This research will provide insights into the complex interplay between these variables and illuminate the mechanisms underlying the motivation to become a teacher in times of digital change.

Therefore, the present study poses the following research questions:

(1) Is the (D)FIT-Choice scale a valid and reliable instrument to assess student teachers' reasons for choosing a teaching career?
(2) What are the most and least important (D)FIT-Choice factors shaping the decision to become a teacher?
(3) What is the relationship between the digital factors of the (D)FIT-Choice and what are their relationships with other factors?

2 Methodology

2.1 Sample

The study required a sample of around 400 participants to sufficiently power the statistical analysis. Specifically, for Exploratory Factor Analysis (EFA), the moderate subject-to-item ratio of 5:1 can be followed (Costello & Osborne, 2005; Kyriazos, 2018). Based on this ratio and considering 66 items, a minimum of 330 participants would be needed. However, some studies recommend that a minimum sample of 400 is needed to get reliable factor patterns in EFA (Goretzko et al., 2021; Wolf et al., 2013). For the correlation analysis, a sample of 314 was determined using G*Power (Faul et al., 2007).

The developed questionnaire was sent to a sample of 734 student teachers, reaching an overall response rate of 69% to give a sample of 506 participants. A relative speed index was calculated based on completion time and one case was eliminated from the sample because it had a factor higher than two (Leiner, 2019). Another case that incorrectly reported age was also eliminated.

The final sample therefore consisted of 506 student teachers from two different universities in Zurich, Switzerland. They were enrolled on one of four different programmes, which differ qualitatively, as they offer different accreditation levels and have different workloads (Table 1).

In terms of gender distribution, 313 participants (61.9%) were women, 176 (34.48%) were men, three (0.6%) defined themselves in other terms and 14 (2.8%) preferred not to answer. The mean age was 28.2 years old (SD = 8.66). The prospective teachers in upper secondary education were older as they are required to have at least a Bachelor's degree before entering this programme. Participants had a mean of 1.01 years of experience teaching (SD = 4.03).

2.2 Procedure

Since this study aimed to collect data from student teachers at the beginning of their training, data were collected one month into their programmes, in October 2022, March 2023 and October 2023. Data were collected through an online survey hosted on the LimeSurvey platform.

Table 1 Sample distribution in terms of educational programme

Programme	University	Frequency (n)	Percentage (%)	Workload (ECTS)
Bachelor's degree for primary education	PHZH	131	25.9	180
Master's degree for lower secondary education	PHZH	117	23.1	270
Upper secondary and vocational education	PHZH	53	10.5	60
Upper secondary education	UZH	205	40.5	60

PHZH (Zurich University of Teacher Education, Pädagogische Hochschule Zürich), UZH (University of Zurich), ECTS (European Credit Transfer and Accumulation System)

Each programme required different recruitment methods. For primary education student teachers, in the first cohort we presented the study in a face-to-face session and invited them to answer the survey in situ. For lower and upper secondary student teachers, we sent them a personalized email with a reminder two weeks later. Finally, upper secondary and vocational education student teachers were contacted via anonymous email. This was also the case for primary education student teachers in the second cohort. The participation rate was 69% in primary education, 56% in lower secondary education, 64% in upper secondary and vocational and 81% in upper secondary trainees.

2.3 Instrument

The (D)FIT-Choice scale was developed by extending the FIT-Choice scale (Watt et al., 2012; Watt & Richardson, 2007). We employed the German version of the FIT-Choice scale as most students in the sample are native German-language speakers (N = 467, 92.3%) or have a proficient level of German required to enter the studies, concretely a C1 level based on the Common European Framework of Reference for Languages (CEFR). The four new added factors were: Prior digital technology use, as part of Socialization Influences; Perceived digital teaching competence, as part of Self-perceptions; Contribute to the digital transformation, as part of Social Utility Value; and Intrinsic value subject, as part of Intrinsic Value. Following the original structure of the FIT-Choice scale, each new factor included three items, in which participants are asked to respond to the statement "I chose to become a teacher because…" via a seven-point Likert scale (1 = not at all important; 7 = extremely important). The new items were originally written and tested in German and have been translated for the purpose of this paper.

In addition to the development of new subscales, the existing subscales Job transferability and Fallback career have been shown to have weak reliability (Navarro-Asencio et al., 2021; Watt & Richardson, 2007) and therefore their items were rephrased or new items were created. Additional items were formulated and added to those subscales that consisted of only two items. Having equal number of items per subscale ensures that the subscales have the potential of measuring similar amounts of variance.

The final version of the scale includes nine second order factors and 22 first order factors, with three items each. The wording of the items is shown in Table 2.

2.4 Data analysis

The data collected from the four groups was analysed using Jamovi (The Jamovi Project, 2022) an open-source statistical platform based on the statistical programming language R—RStudio and the lavaan package (R Core Team, 2021; Rosseel, 2012). Analyses included: (1) descriptive statistics of single items and subscales, and reliability analysis; (2) Exploratory Factor Analysis (EFA) to assess the factorial structure of the (D)FIT-Choice scale; (3) Confirmatory Factor Analysis (CFA) to test the expected structure of the scale; (4) correlational analysis to explore relationships between the digital-related factors and the other factors; (5) regression analysis

Table 2 Descriptive statistics (M, SD) and reliability statistics (α/ω) of factors (in bold) and items (α/ω if item dropped)

Code	Items (English translation)	M	SD	α	ω
	How important are the following reasons in your decision to become a teacher? "I chose to become a teacher because…" 1 (not at all important) – 7 (extremely important)				
PTA	**Perceived teaching abilities**	**5.90**	**0.78**	**0.773**	**0.783**
pta1	I have the qualities of a good teacher	5.91	0.92	0.636	0.653
pta2	I have good teaching skills	5.68	1.08	0.716	0.720
pta3	Teaching is a career suited to my abilities	6.10	0.81	0.728	0.734
PDTC[1]	**Perceived digital teaching competence**	**4.40**	**1.36**	**0.924**	**0.924**
pdtc1[1]	I know how to use digital technologies to improve students' learning	4.33	1.47	0.890	0.891
pdtc2[1]	I know how to use digital technologies to improve teaching	4.45	1.48	0.887	0.887
pdtc3[1]	I know how to successfully incorporate digital technologies in the classroom	4.43	1.45	0.893	0.893
IVT	**Intrinsic value teaching**	**6.49**	**0.59**	**0.705**	**0.707**
ivt1	I am interested in teaching	6.44	0.79	0.603	0.606
ivt2	I like teaching	6.43	0.77	0.617	0.621
ivt3[1]	I want to create interesting lessons	6.60	0.68	0.622	0.622
IVS[1]	**Intrinsic value subject**	**6.08**	**0.78**	**0.665**	**0.699**
ivs1[1]	I find the content of my subjects interesting	6.22	0.92	0.517	0.530
ivs2[1]	I enjoy dealing with the content of my subjects	6.18	0.91	0.491	0.503
ivs3[1]	My subjects are important	5.85	1.18	0.719	0.719
JS	**Job security**	**5.19**	**1.26**	**0.868**	**0.870**
js1	Teaching will offer a steady career path	5.16	1.46	0.826	0.828
js2	Teaching will provide a reliable income	5.30	1.35	0.840	0.840
js3	As a teacher you have a secure job	5.10	1.45	0.773	0.775
TFF	**Time for family**	**4.67**	**1.55**	**0.872**	**0.873**
tff1	Part-time teaching could allow more family time	4.72	1.70	0.848	0.848
tff2	Teaching hours will fit with the responsibilities of having a family	4.77	1.75	0.784	0.784
tff3	School holidays will fit with family commitments	4.51	1.77	0.825	0.825

Table 2 (continued)

Code	Items (English translation)	M	SD	α	ω
JT	**Job transferability**	**4.07**	**1.45**	**0.761**	**0.765**
jt1[2]	Teaching is a useful job if you want to be professionally mobile	4.11	1.67	0.683	0.683
jt2[2]	A teaching qualification is recognized in many parts of the world, and you can work anywhere	4.21	1.77	0.728	0.730
jt3	A teaching job will allow me to choose where I wish to live	3.88	1.85	0.628	0.624
SFCA	**Shape the future of children and adolescents**	**5.90**	**0.95**	**0.751**	**0.753**
sfca1	Teaching will allow me to shape child/ adolescent values	6.09	1.08	0.714	0.715
sfca2	Teaching will allow me to influence the next generation	5.76	1.23	0.646	0.648
sfca3[1]	As a teacher I can help shape the future of our society	5.85	1.19	0.634	0.638
ESE	**Enhance social equity**	**5.64**	**1.14**	**0.874**	**0.879**
ese1	Teaching will allow me to raise the ambitions of underprivileged youth	5.95	1.14	0.855	0.855
ese2	Teaching will allow me to benefit the socially disadvantaged	5.49	1.33	0.770	0.777
ese3[1]	As a teacher I can help to balance out inequalities in society	5.49	1.36	0.836	0.841
MSC	**Make a social contribution**	**5.77**	**1.10**	**0.815**	**0.831**
msc1	Teaching allows me to provide a service to society	6.00	1.15	0.694	0.718
msc2	Teachers make a worthwhile social contribution	6.07	1.12	0.771	0.793
msc3	Teaching enables me to 'give back' to society	5.25	1.56	0.779	0.779
WCA	**Work with children and adolescents**	**5.71**	**1.12**	**0.895**	**0.901**
wca1	I want a job that involves working with children/adolescents	5.56	1.30	0.801	0.817
wca2	I want to work in a child-/adolescent-centred environment	5.45	1.34	0.828	0.841
wca3	I like working with children/adolescents	6.13	1.03	0.905	0.905
CDT[1]	**Contribute to the digital transformation**	**4.10**	**1.39**	**0.872**	**0.875**
cdt1[1]	I want to design innovative lessons with digital technologies	4.21	1.57	0.872	0.872
cdt2[1]	I want to teach young people digital skills	4.04	1.58	0.772	0.772
cdt3[1]	I want to prepare young people for life in a digital world	4.05	1.53	0.810	0.810
FC	**Fallback career**	**2.37**	**1.31**	**0.672**	**0.737**

Table 2 (continued)

Code	Items (English translation)	M	SD	α	ω
fc1[1]	I chose the teaching degree programme because I have few chances of working in my desired profession	2.07	1.68	0.537	0.607
fc2[1]	I chose the teaching degree programme to have an additional career alternative	3.41	2.10	0.717	0.749
fc3[1]	I would only become a teacher if I couldn't find another job	1.62	1.15	0.518	0.528
PTLE	**Prior teaching and learning experiences**	**5.24**	**1.10**	**0.881**	**0.886**
ptle1	I have had inspirational teachers	5.22	1.62	0.785	0.786
ptle2	I have had good teachers as role-models	5.16	1.57	0.788	0.790
ptle3	I have had positive learning experiences	5.34	1.47	0.907	0.908
PDTU[1]	**Prior digital technology use**	**3.25**	**1.37**	**0.819**	**0.828**
pdtu1[1]	I have had innovative teachers who used technology for education	3.05	1.56	0.688	0.689
pdtu2[1]	I had teachers who taught me skills to learn effectively with digital media	2.97	1.57	0.717	0.718
pdtu3[1]	I have had positive learning experiences with educational technologies	3.73	1.66	0.841	0.841
SI	**Social influences**	**3.97**	**1.77**	**0.874**	**0.879**
si1	My friends think I should become a teacher	4.03	1.98	0.776	0.777
si2	My family think I should become a teacher	3.66	2.04	0.889	0.889
si3	People I've worked with think I should become a teacher	4.21	1.93	0.797	0.797
	For each question below, please rate the extent to which YOU agree it is true about teaching. 1 (not at all) – 7 (extremely)				
EC	**Expert career**	**5.73**	**0.89**	**0.740**	**0.754**
ec1	Do you think teaching requires high levels of expert knowledge?	5.33	1.25	0.553	0.562
ec2	Do you think teachers need high levels of technical knowledge?	5.71	1.14	0.568	0.588
ec3[2]	Do you think teachers need a lot of pedagogical and psychological knowledge?	6.15	0.91	0.782	0.784
HD	**High demand**	**5.80**	**0.87**	**0.736**	**0.753**
hd1	Do you think teachers have a heavy workload?	5.62	1.07	0.616	0.618
hd2	Do you think teaching is emotionally demanding?	6.00	1.02	0.773	0.774
hd3	Do you think teaching is hard work?	5.78	1.13	0.523	0.523

Table 2 (continued)

Code	Items (English translation)	M	SD	α	ω
SS	**Social status**	**4.41**	**1.26**	**0.891**	**0.891**
ss1	Do you believe teaching is perceived as a high-status occupation?	4.34	1.40	0.816	0.816
ss2	Do you believe teaching is a well-respected career?	4.49	1.39	0.847	0.847
ss3	Do you think teachers feel their occupation has high social status?	4.40	1.38	0.869	0.869
SY	**Salary**	**4.98**	**1.09**	**0.858**	**0.878**
sy1	Do you think teaching is well paid?	5.08	1.22	0.725	0.725
sy2	Do you think teachers earn a good salary?	5.14	1.21	0.711	0.711
sy3[1]	Do you think that teachers benefit from good social benefits (e.g., allowances, pension rights)?	4.74	1.26	0.945	0.945
	For each question below, please rate the extent to which it is true for YOU. 1 (not at all) – 7 (extremely)				
SD	**Social dissuasion**	**3.27**	**1.41**	**0.622**	**0.658**
sd1	Were you encouraged to pursue careers other than teaching?	3.68	1.88	0.368	0.368
sd2	Did others tell you teaching was not a good career choice?	2.77	1.88	0.691	0.691
sd3	Did others influence you to consider careers other than teaching?	3.36	1.85	0.475	0.475
SN	**Satisfaction**	**6.15**	**0.92**	**0.882**	**0.891**
sn1	How satisfied are you with your choice of becoming a teacher?	6.09	1.03	0.761	0.762
sn2	How happy are you with your decision to become a teacher?	6.08	1.00	0.804	0.804
sn3[1]	How determined are you to become a teacher in any case at the end of your studies?	6.28	1.04	0.924	0.924

[1] New items, [2] Edited items (items before edits: jt1 - Teaching will be a useful job for me to have when travelling; jt2 - A teaching qualification is recognized everywhere; ec3 – Do you think that teachers need highly specialized knowledge?)

to analyse the predictability of the item 'Contribute to the digital transformation' based on the other two digital factors.

A significance level of $p < 0.05$ was adopted. In the case of correlations, the alpha level was adjusted via the Bonferroni correction. The indices used to evaluate the reliability of the factors were Cronbach's alpha (α) and McDonald's omega (ω), accepting 0.7 as a sufficient measure of reliability (Dunn et al., 2014; Taber, 2018). The effect sizes were set at r = 0.1 (small), 0.3 (medium) and 0.5 (large) (Cohen, 1992; Plonsky & Oswald, 2014).

The indicators used to evaluate the goodness of fit of the CFA were the Bentler Comparative Fit Index (CFI), the Tucker Lewis Index (TLI), the Steiger-Lind Root Mean Square of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR). The cut-off criteria were as follows: CFI > 0.95; TLI > 0.95; SRMR < 0.08; RMSEA < 0.06 (Hooper et al., 2008; Hu & Bentler, 1999; Schreiber et al., 2006).

3 Results

3.1 Reliability analysis and descriptive statistics

Based on the data collected with the individual items in each factor, the factors showed Cronbach's α coefficients ranging from 0.622 to 0.924 and McDonald's ω coefficients ranging from 0.658 to 0.924 (Table 2). Most factors had good-to-excellent reliability, indicating strong internal consistency across their constituent items. The only factors that had lower reliability, with coefficients between 0.6 and 0.7, were Social dissuasion (α = 0.622, ω = 0.685), Intrinsic value subject (α = 0.665, ω = 0.699) and Fallback career (α = 0.672, ω = 0.737).

The descriptive statistics (mean and standard deviation) show that the highest rated factors were Intrinsic value teaching (M = 6.49, SD = 0.92), Satisfaction (M = 6.15, SD = 0.92), and Intrinsic value subject (M = 6.08, SD = 0.78), followed by Shape the future of children and adolescents (M = 5.90, SD = 0.95) and Perceived teaching ability (M = 5.90, SD = 0.78). The factors scoring below the midpoint of 4 were Fallback career (M = 2.37, SD = 1.31), Prior digital technology use (M = 3.25, SD = 1.37), Social dissuasion (M = 3.27, SD = 1.41) and Social influences (M = 3.97, SD = 1.77).

3.2 Exploratory Factor Analysis

An Exploratory Factor Analysis (EFA) was conducted using the maximum likelihood extraction method in combination with oblimin rotation. Barlett's Test of Sphericity was significant (X^2 (2145) = 19,224, $p < 0.001$), indicating that the correlation structure was adequate for factor analyses. The Kaiser-Meyer Olkin (KMO) Measure of Sampling Adequacy (MSA) indicated values above 0.6 (except for sd3, MSA = 0.570), verifying the sampling adequacy for the analysis.

By fixing 22 factors, we expected to observe the 22 first order theoretical factors (Table 3). The solution explained 66.00% of the total variance and presented a good model fit (RMSEA = 0.0210, 90% CI [0.0165, 0.0253], X^2 (924) = 1132, $p < 0.001$). All factors except two were defined as theorized (Table 3), the exceptions being Factor 12 (with all PTA items and ivt2 together) and Factor 16 (with IVT and IVS together). However, this model is very approximate to the (D)FIT-Choice theoretical model.

3.3 Confirmatory Factor Analysis

First and second order CFAs were conducted to validate whether the data fits the structure of the (D)FIT-Choice model. For the first order CFA, the manifest single items were specified as indicators for each factor. For the second order CFA, the different factors were specified as indicators for the higher order factors. In both cases, SRMR and RMSEA indicated good fit values, but CFI and TLI were below the required threshold (CFI < 0.95; TLI < 0.95; RMSEA < 0.05; SRMR < 0.08; Table 4). However, this inconsistency between fit values might be due to the arbitrariness of the cut-off values. For instance, CFI and TLI values above 0.9 have previously been accepted as being of adequate fit (Bentler & Bonett, 1980; McDonald & Ho, 2002) and values between 0.90 and 0.95 could be considered as neither good nor bad fit (Lai & Green, 2016).

Since the data do not exactly meet the fit standards, but the FIT-Choice model is a validated model, single factor CFAs were conducted specifically to test that the digital-related factors fit their assigned higher order scale. The manifest single items were specified as indicators for the first order factors and the first order factors were specified as latent indicators of the second order factors. Each second order factor was analysed independently, and all demonstrated good fit (CFI > 0.95; TLI > 0.95; RMSEA < 0.05; SRMR < 0.08; Table 5).

3.4 Correlations

Assumptions of normality and absence of outliers were tested using the Shapiro-Wilk test and visualization methods including Q-Q plots, histograms, density plots and box plots. For some variables, the sample data appeared to be non-normally distributed and presented outliers. Most variables presented tied data, therefore, Kendall's correlation was used. In total, 231 bivariate correlations were performed with the (D)FIT-Choice first order factors' mean scores. To hold the Type I error rate (false-positive cases) to less than 5%, the critical p value was adjusted via the Bonferroni correction ($p < 0.0002$). The correlations between the (D)FIT-Choice factors are reported in Table 6.

The three digital-related factors (Prior digital technology use; Perceived digital teaching competence; Contribute to the digital transformation) were significantly correlated ($r_{\tau\ pdtc-cdt} = 0.447$; $r_{\tau\ pdtu-cdt} = 0.408$; $r_{\tau\ pdtc-pdtu} = 0.321$), with medium effect sizes. Perceived digital teaching competence was also correlated with Perceived teaching ability ($r_{\tau} = 0.208$), Intrinsic value subject ($r_{\tau} = 0.129$), Intrinsic

Table 3 Exploratory Factor Analysis with 22 fixed factors, factor loadings

	Factors																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Unique-ness
pdtc2	0.869																						0.1794
pdtc1	0.866																						0.1840
pdtc3	0.841																						0.1930
wca1		0.937																					0.1125
wca2		0.868																					0.2015
wca3		0.726																					0.3571
ss1			0.871																				0.1853
ss3			0.837																				0.3091
ss2			0.797																				0.2478
sn1				0.987																			0.0590
sn2				0.850																			0.2013
sn3				0.625																			0.4663
ptle1					0.939																		0.1301
ptle2					0.885																		0.1870
ptle3					0.662																		0.4407
si1						0.942																	0.1234
si3						0.847																	0.2300
si2						0.668																	0.4211
tff2							0.928																0.1531
tff3							0.786																0.3119
tff1							0.711																0.3578
sy2								0.973															0.0513
sy1								0.888															0.1417
sy3								0.439															0.5362
dt2									0.835														0.1681

Table 3 (continued)

	Factors																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Uniqueness
dt3									0.827														0.2643
dt1									0.622														0.3623
ese2										0.977													0.0772
ese3										0.646													0.3199
ese1										0.626													0.3362
js3											0.889												0.1685
js1											0.669												0.3094
js2											0.641												0.3109
pta1												0.750											0.3727
pta2												0.708											0.4433
pta3												0.632											0.4122
ivt2												0.344											0.5277
msc1													0.858										0.2188
msc3													0.644										0.3956
msc2													0.491										0.3853
hd3														0.891									0.2107
hd1														0.682									0.4105
hd2														0.494									0.6382
pdtu1															0.824								0.2674
pdtu2															0.789								0.2625
pdtu3									0.376						0.388								0.4304
ivs1																0.702							0.4448
ivs2																0.670							0.4573
ivs3																0.437							0.6322

Table 3 (continued)

	Factors																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Unique-ness
ivt3																0.341							0.5616
ivt1																0.307							0.5476
ec1																	0.796						0.3491
ec2																	0.786						0.2867
ec3																	0.381						0.5867
fc3																		0.856					0.1958
fc1																		0.673					0.5245
fc2																		0.393					0.5979
jt3																			0.686				0.3998
jt1																			0.590				0.4263
jt2																			0.553				0.4604
sd1																				0.842			0.2793
sd3																				0.605			0.6013
sd2																				0.335			0.7037
sfca2																					0.545		0.4428
sfca3													0.343								0.431		0.3482
sfca1																					0.362		0.5199

Table 4 Fit statistics for the first and second order CFAs

	X^2	df	p	CFI	TLI	SRMR	RMSEA	RMSEA 90% CI	
								Lower	Upper
First order CFA[1]	2890	1845	<0.001	0.942	0.933	0.041	0.033	0.031	0.036
Second order CFA[1]	3468	2019	<0.001	0.920	0.915	0.060	0.038	0.036	0.040

[1]Residual covariances added (First order CFA: pdtu1-pdtu2, pdt2-pdt3, ec1-ec2; Second order CFA: PDTC-CDT, CDT-PDTU, PDTC-PDTU, ec1-ec2)

Table 5 Fit statistics for the independent higher order CFAs

								RMSEA 90% CI	
Higher order factors	X^2	df	p	CFI	TLI	SRMR	RMSEA	Lower	Upper
Socialization influences	75.8	48	0.006	0.990	0.986	0.031	0.034	0.018	0.048
Self-perception	17.0	8	0.030	0.994	0.990	0.031	0.047	0.014	0.078
Intrinsic value	12.8	8	0.118	0.992	0.986	0.027	0.034	<0.001	0.068
Personal utility value[1]	79.8	21	<0.001	0.975	0.957	0.028	0.074	0.057	0.092
Social utility value	206	80	<0.001	0.971	0.962	0.035	0.056	0.047	0.065
Task demand[1]	18.01	6	0.006	0.986	0.965	0.023	0.063	0.031	0.097
Task return	26.3	8	<0.001	0.991	0.983	0.039	0.067	0.039	0.097

[1]Residual covariances added (Personal utility value: tff2-tff3, jt1-jt2, js1-js2; Task demand: ec1-ec2, hd1-hd2)

value teaching ($r_\tau = 0.126$), and Job security ($r_\tau = 0.127$). Prior digital technology use also correlated with Prior teaching and learning experience ($r_\tau = 0.225$), Job transferability ($r_\tau = 0.177$), and Shape the future of children and adolescents ($r_\tau = 0.129$). Finally, Contribute to the digital transformation correlated with Make a social contribution ($r_\tau = 0.131$). However, all the correlations with non-digital factors had rather small effect sizes.

3.5 Multiple linear regression

A stepwise multiple linear regression was applied to analyse the effect of different factors on the dependent variable Contribute to the digital transformation as a motive for becoming a teacher. The variables were introduced in a hierarchical order according to the theory behind the model. First, Prior digital technology use and Perceived digital teaching were considered; second, the rest of the variables of the higher order factor under which the digital-related factors are located were introduced. This includes Perceived teaching ability, Shape the future of children and adolescents, Enhance social equity, Make a social contribution, Work with children

Table 6 Correlations between first order factors (Kendall's Tau B, r_τ)

	PTA	PDTC	IVT	IVS	JS	TFF	JT	SFCA	ESE	MSC	WCA	CDT	FC	PTLE	PDTU	SI	EC	HD	SS	SY	SD	SN
PTA	-																					
PDTC	0.208*	-																				
IVT	0.382*	0.126*	-																			
IVS	0.125*	0.129*	0.306*	-																		
JS	0.104	0.127*	0.065	0.010	-																	
TFF	0.024	0.099	–0.002	0.026	0.384*	-																
JT	0.059	0.112	–0.011	–0.031	0.392*	0.260*	-															
SFCA	0.206*	0.099	0.186*	0.083	0.159*	0.084	0.145*	-														
ESE	0.145*	0.088	0.251*	0.151*	0.120*	0.051	0.147*	0.477*	-													
MSC	0.153*	0.078	0.267*	0.208*	0.154*	0.107	0.103	0.500*	0.488*	-												
WCA	0.227*	0.095	0.338*	0.032	0.071	0.035	0.095	0.265*	0.292*	0.248*	-											
CDT	0.002	0.447*	0.047	0.036	0.082	0.033	0.076	0.113	0.113	0.131*	0.058	-										
FC	–0.061	0.086	–0.186*	0.006	0.031	0.050	0.100	0.002	–0.045	–0.036	–0.237*	0.108	-									
PTLE	0.099	0.043	0.150*	0.156*	0.067	0.103	0.050	0.078	0.054	0.140*	0.135*	0.043	–0.055	-								
PDTU	0.034	0.321*	0.050	0.010	0.113	0.051	0.177*	0.129*	0.086	0.080	0.117	0.408*	0.068	0.225*	-							
SI	0.118	0.091	0.063	–0.041	0.140*	0.091	0.143*	0.167*	0.120*	0.125*	0.150*	0.115	0.021	0.121*	0.228*	-						
EC	0.175*	0.112	0.210*	0.266*	0.064	–0.015	–0.003	0.127*	0.166*	0.171*	0.113	0.039	–0.059	0.125*	0.068	–0.012	-					
HD	0.103	0.031	0.107	0.080	0.063	–0.019	0.017	0.206*	0.168*	0.161*	0.146*	0.002	–0.113	0.009	0.020	0.085	0.273*	-				
SS	0.091	0.017	0.053	0.085	0.241*	0.117	0.163*	0.140*	0.147*	0.145*	0.068	0.047	0.024	0.067	0.093	0.076	0.088	0.061	-			
SY	0.099	0.008	0.020	0.068	0.245*	0.124*	0.102	0.070	0.065	0.060	0.026	0.004	0.053	0.081	0.062	0.044	0.037	0.023	0.423*	-		
SD	–0.029	0.042	–0.001	–0.044	–0.004	0.029	0.049	0.072	0.028	0.033	0.003	0.040	0.098	0.013	0.092	0.098	–0.036	–0.026	–0.089	–0.011	-	
SN	0.293*	0.062	0.377*	0.123	0.064	0.027	–0.017	0.121	0.129*	0.143*	0.280*	0.016	–0.276*	0.131*	0.023	0.073	0.189*	0.071	0.074	0.079	–0.082	-

*Significant ($p < 0.0002$)

Table 7 Multiple linear regression, model fit measures

				Overall model test			
Model	R	R^2	RMSE	F	df1	df2	p
1	0.666	0.444	1.039	200.7	2	503	< 0.001
2	0.699	0.488	0.996	59.3	8	497	< 0.001
3	0.712	0.507	0.978	23.7	21	484	< 0.001

Table 8 Multiple linear regression, Model 3 coefficients

Predictor	Estimate	SE	t	p
Intercept	25.041	0.6543	3.827	< 0.001
PDTC	0.4070	0.0426	9.561	< 0.001
PDTU	0.4536	0.0401	11.306	< 0.001
PTA	-0.2481	0.0709	-3.497	< 0.001
SFCA	-0.0492	0.0702	-0.701	0.484
ESE	0.0868	0.0566	1.533	0.126
MSC	0.1843	0.0593	3.108	0.002
WCA	0.0504	0.0496	1.017	0.310
PTLE	-0.0690	0.0369	-1.870	0.062
IVT	-0.0244	0.1039	-0.235	0.814
IVS	-0.0872	0.0694	-1.256	0.210
JS	0.0424	0.0497	0.853	0.394
TFF	-0.0345	0.0349	-0.988	0.324
JT	-0.1022	0.0387	-2.642	0.009
FC	0.0573	0.0399	1.437	0.151
SI	-0.0197	0.0280	-0.705	0.481
EC	-0.0265	0.0587	-0.451	0.652
HD	-0.0635	0.0576	-1.103	0.271
SS	0.0294	0.0440	0.668	0.504
SY	-0.0525	0.0513	-1.025	0.306
SD	-0.0416	0.0332	-1.251	0.211
SN	0.0528	0.0597	0.884	0.377

and adolescents, and Prior teaching and learning experiences. Finally, the remaining variables were added. The Shapiro-Wilk tests indicated a normal distribution of the data in all three models and the Variance Inflation Factors (VIF) and Tolerances showed no collinearity, indicating adequacy for analysis.

Results indicated that all three models were significant (see Table 7) but that only four variables significantly contributed to the predictability of the dependent variable in the third and more complex model (see Table 8). These variables are Perceived digital teaching competence, Prior digital technology use, Perceived teaching ability, Make a social contribution, and Job transferability.

4 Discussion

The present study aimed to investigate the digital-related reasons that influence student teachers' decisions to become teachers. The (D)FIT-Choice scale was developed and validated. Reliability analysis showed that the scale has very good internal consistency in most factors, except for Social dissuasion, Intrinsic value subject, and Fallback career. In both Exploratory and Confirmatory Factor Analysis, most factors appeared as theorized.

The most important reasons for becoming a teacher included finding value in teaching and in the specific subjects, as shown in previous research (Fray & Gore, 2018). This was followed by Shape the future of children and adolescents, and Perceived teaching abilities. The least important general factors were Fallback career and Prior digital technology use. High levels of satisfaction with the choice were aligned with low ratings on being socially dissuaded or pursuing teaching as a fallback career.

Regarding the digital-related factors, it is worth noting that having used digital technology in their own education was one of the factors that least motivated student teachers to pursue a teaching career. And although student teachers highlighted the importance of having good teaching abilities for choosing a teaching career, this did not seem to be the case with digital teaching competences. As numerous studies have shown that digital teaching skills are a core prerequisite for effective technology use in teaching (Davies & West, 2014; Niederhauser & Lindstrom, 2018), the low importance given to digital teaching competence in the decision to become a teacher should be a matter for concern. Although student teachers indicated that they want to bring value to society, particularly in shaping the future of children and adolescents, wanting to contribute to digital transformation was among the less important aspects for choosing a teaching career. Furthermore, only a very low significant correlation was found between the willingness to contribute to the digital transformation and the motivation to make a social contribution, but none with shaping the future of children and young people. Looking at other correlations, the importance of having used technology in education correlated with the importance of job transferability, and the relevance of perceiving having good digital teaching skills correlated with the importance of job security. These factors capture the practical benefits of the job, rather than reflecting teaching-related intentions. In summary, prospective teachers do not appear to consider digital aspects as central motives for becoming a teacher. Instead, it seems plausible that they consider technological experiences as independent from pedagogical duties.

Motivation to contribute to digital transformation is of relevant importance in the current educational scenario. Therefore, it is worth noting that this willingness can be predicted based on prior use of digital technologies, perceived digital teaching competence, perceived teaching ability and willingness to make a social contribution. The finding that becoming a teacher to make a social contribution also influences the motivation to contribute to digital transformation could be related to the altruistic motives and expectations found in previous studies (Fray & Gore, 2018; Friedman, 2016). Emphasis should be placed on prior use of technologies

for teaching and learning, perceived competence in teaching and, more specifically, in teaching with technology (Tondeur et al., 2017; Zhao et al., 2021). This could help to raise their awareness of the importance of digital change for their future career, and increase their willingness to contribute to the digital transformation of education.

4.1 Limitations and future research

Although this study offers interesting insights, especially useful to the educational research community, it also has several limitations.

We relied on a sample of nine cohorts from two institutions of teacher education in Switzerland, a very homogeneous sample that limits the generalizability of the findings. To improve the representativeness of the sample, future studies should aim to include larger and more diverse groups of student teachers from different universities and cultural backgrounds to determine if the results can be replicated in a different population. A larger sample could also increase the reliability and validity of the results, specifically in the cases of Social dissuasion, Intrinsic value subject, and Fallback career, factors that presented low reliability.

While inter-item reliability was tested, consistency across time should also be tested by analysing intra-subject reliability. Furthermore, the factor Intrinsic value subject could be tested for reliability and subjected to factor analysis with upper secondary education student teachers to determine whether this factor is more useful when considering the specificity of this group.

Although the (D)FIT-Choice scale includes four new factors, three of which are digital-related factors that are important in today's context, the FIT-Choice scale has been criticized for not allowing the detection of new factors (Fray & Gore, 2018). Therefore, mixed methods studies that incorporate interviews with participants would be useful to identify and explore additional factors that may be relevant to understanding teacher motivations.

In alignment with the findings of the correlation analysis, future research should conduct a deeper analysis of the prior experiences of student teachers with digital technology in education, and the relationships of these experiences with Personal utility value. It would also be interesting to see whether teacher motivations are useful predictors of teacher satisfaction and performance.

Finally, the differences in the study programme and in years of teaching experience of the sample could be used to analyse possible differences in the digital-related reasons for becoming a teacher.

In summary, this study provides valuable insights into the motivations of student teachers, but future research should consider the above limitations and suggestions to further enhance the understanding of teacher motivations and inform the development of effective teacher education programmes towards the digital transformation of education.

4.2 Conclusion

This study provides important insights into the digital-related factors that influence student teachers' decisions to become teachers. The (D)FIT-Choice scale is a valid and reliable instrument for measuring these factors. Intrinsic value teaching and subject are the most important reasons for choosing a teaching career, followed by Shaping the future of children and adolescents, and Perceived teaching abilities. Prior digital technology use, Perceived digital teaching competence and Contribute to the digital transformation were found to have a limited influence on the decision to become a teacher. This is not aligned with what is expected of student teachers in the current educational context, which promotes the digital transformation of education and highlights the need for further analysis of these aspects. The results also emphasize the importance of promoting digital tools in education to cultivate digital competence among student teachers and to encourage them to see digital transformation in education as a motivation for becoming teachers in the digital era. These findings have implications for teacher education to better prepare future teachers for the current and future digital educational context.

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Data availability The dataset generated during the current study are available from the corresponding author on reasonable request. The original scale with the items in German can also be obtained under request.

Declarations

Conflict of interest There are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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