





Determinants of 21st Learning Skill Behavior and Pre-Professional Identity in Teacher Candidates

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ABSTRACT

This study examines the relationship between pre-service teachers' 21st century learning skills and pre-service teacher identities. In the study, 306 pre-service teachers who received pedagogical formation training at Kırşehir Ahi Evran University were included in the study. "21st Century Learning Skills Scale" and "Pre-service Teacher Identity Scale" were used to collect data from the participants. The study was conducted within the framework of the relational screening model, and the data were evaluated with t-test, correlation and regression analyses. As a result of the analyses, a positive moderate relationship was found between pre-service teachers' 21st century learning skills and pre-service teacher identities. This situation shows that the development of pre-service teachers' learning skills supports their pre-service identity formation. In addition, when evaluated in terms of the gender variable, it was determined that the pre-service teacher identity perceptions of female pre-service teachers were significantly higher than those of males. However, no significant difference was found between genders in terms of learning skills. In line with these findings, it is recommended that teacher training programs be restructured to include more critical thinking, problem solving, digital literacy and self-regulation skills. Finally, in order to expand research in this area, it is recommended that comparative studies be conducted in different socio-cultural contexts, longitudinal analyses be conducted and teacher identity development be examined in depth through qualitative research.

Keywords:

Teacher identity, learning skills, pre-professional identity, pedagogical training

1. Introduction

The pedagogical training processes of teachers, who are the cornerstone of education systems, are of great importance. These programs, designed to provide teacher candidates with the necessary knowledge, skills, and attitudes before starting their professional careers, play a critical role in shaping teacher identity (Korthagen, 2016). Teacher identity is a critical notion that expresses teacher candidates' professional self-perception and how they view the process of becoming a teacher (Erdem, 2020). Pre-professional teacher identity is shaped within the framework of the values, beliefs, and motivations that candidates have regarding the teaching profession (Taner & Karaman, 2013). Building this identity on strong and solid foundations creates positive effects on teachers' professional development and classroom performance (Demir, Durmaz, Yavuzalp, Bayram, & Göktaş, 2023). Therefore, an in-depth examination of pre-professional teacher identity contributes to a more effective structuring of the teaching programs and practices of education faculties.

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Modern learner skills encompass the understanding, abilities, and proficiencies students need to develop in accordance with the demands of contemporary educational approaches. These abilities encompass various essential competencies, including critical thinking, problem-solving, teamwork, information literacy, and digital skills (Orhan, Kurt, Ozan, Vural, & Türkan, 2014). It is critical that education systems provide these skills to teacher candidates to ensure that future teachers can effectively transfer these skills to their students. The economic system, social life, and technological advances in the age we live in require individuals, who are the products of the education system, to have certain competencies and abilities (Elvan & Mutlubaş, 2020). This situation, which has been valid throughout human history, has gained even more importance in the 21st century. The skills required to be successful in the complex business and social life of the new century are generally examined in the literature under the title of 21st-century skills (Eğmir & Erdem, 2021). Integrating these skills into schools and imparting them to students is an extremely important necessity, and this process is very important both pedagogically and in terms of measuring these skills. It is possible for students to acquire 21st-century skills thanks to teachers who will guide students in the process of teaching these skills (Harris, Mishra, & Koehler, 2009).

In this regard, examining teachers' 21st-century learning skills is of great importance in order to contribute to students' acquisition of the necessary equipment to be successful in the complex world of the future. This study examines the effects of pedagogical training programs on the degree of teacher candidates' use of 21st-century learning skills and their pre-professional teacher identity. In order to evaluate the development of teacher candidates in this process, data were collected using the 21st Century Learning Skills Use Scale and Pre-Professional Teacher Identity Scale. The main purpose of this research is to investigate the level of use of learning skills and pre-professional teacher identities of teacher candidates who are currently receiving or have completed pedagogical training. Additionally, it investigates the correlation between teacher identity and learner development.

1.1. Pre-Professional Teacher Identity

The significance of teachers and their role in the education system are unquestionable aspects of the teaching-learning process. This highlights concepts such as "teacher quality" and "teacher competence." However, the literature also focuses on the concept of "teacher identity," which includes various factors like the teacher's background, core beliefs, motivational framework, and their role in advancing education (Friesen & Besley, 2013; Motallebzadeh & Kazemi, 2018). In teaching, who the teacher is becomes as important as what they teach. Recent educational research, particularly on the development of professional identities of teachers, has shown that teachers' self-perceptions are decisive in their roles (Day & Kingston, 2008). Kress (2011) states that teacher identity is not just a combination of self-perceptions but that individuals' identities are open to change throughout their lives. The importance of teacher identity is emphasized in terms of educational philosophy, decision-making, well-being, and teaching effectiveness (Beijaard, Meijer, & Verloop, 2004; Mockler, 2011).

The literature offers various definitions of teacher identity, based on different theoretical approaches. Some emphasize the social and cultural aspects of identity, while others highlight its discursive and narrative dimensions. Most modern perspectives concur that identity is formed within a social context and is fluid and evolving, rather than static (van Lankveld, Schoonenboom, Volman, Croiset, & Beishuizen, 2017). While some studies consider the improvement of teacher identity a smooth process, many describe it as a struggle due to the need to reconcile different and sometimes conflicting perspectives (Beijaard et al., 2004). This has led to the prominence of social contexts in describing identity of teacher. The personal dimension of identity includes an individual's knowledge, beliefs, and emotions, addressing the question, "What kind of teacher am I really?" Studies over the past decade have examined teacher identity based on these social and personal dimensions (Avalos & De Los Rios, 2013; Beauchamp & Thomas, 2009). Motallebzadeh and Kazemi (2018) argue that teacher identity can be influenced by culture, society, racial structure, adopted religious beliefs, and gender characteristics. Friesen and Besley (2013) state that understanding prospective teachers' identities is challenging, but their beliefs about becoming a teacher can be shaped during undergraduate education. In conclusion, the concept of teacher identity is dynamic and multifaceted, evolving within both personal and social frameworks. This research seeks to explore the pre-professional identities of prospective teachers across various variables.

Çelik and Kalkan (2019) describe teacher education programs as a prime starting point for raising awareness about the necessity of identity development and providing opportunities for transformative changes. In order to become a teacher in our country, it is necessary to have a faculty of education diploma or a pedagogical formation certificate. Additional factors influencing the formation and development of teacher identity include variables such as personal, sociological, cognitive, and affective traits (Karatepe & Akay, 2020). Therefore, a holistic approach that considers both individual and contextual factors is necessary for understanding the process of teacher identity development.

1.2. 21st Century Learner Skills

Lifelong learning skills refer to the ability of individuals to continuously improve themselves and adapt to new information. The development of these skills allows teacher candidates to be more flexible and adaptive during the educational process. Studies have shown that lifelong learning skills are essential for advancing the professional growth of teachers and teacher candidates (Field, 2020). The learning skills possessed by prospective teachers directly influence their future teaching approaches and pedagogical competencies, determining how they will engage in learning processes and shape their teaching methods throughout their careers (Zimmerman, 2002; Pintrich, 2004). In addition to lifelong learning skills, self-regulation skills play a crucial role in the professional development of teacher candidates. Self-regulation pertains to students' ability to oversee their own learning activities, and these abilities are essential in improving the professional skills of teacher candidates. Recent research on self-regulation skills has demonstrated that developing self-regulation strategies helps teacher candidates implement teaching methods more effectively (Usher & Schunk, 2018). For example, the "Examination of Teacher Candidates' Self-Regulation Skills" study used the Learning Skills Usage Scale to assess these skills and found that self-regulation skills directly impact the academic achievements of teacher candidates (Cleary & Zimmerman, 2019).

Furthermore, studies on fostering critical thinking and problem-solving abilities have demonstrated considerable advancements in pedagogical methods when these techniques are incorporated. That study, which used the Learning Skills Usage Scale, revealed that these strategies positively impact teacher candidates' pedagogical methods (Abrami et al., 2015).

The "Assessment of Lifelong Learning Tendencies" study evaluated the lifelong learning skills of teacher candidates and their impact on professional development. Findings indicated that lifelong learning tendencies support the continuous development of teacher candidates in their careers (Merriam & Baumgartner, 2021). The Learning Skills Usage Scale has been widely cited in educational research for assessing various learning strategies and skills of teacher candidates. Studies, such as those by Cleary and Zimmerman (2019) and Usher and Schunk (2018), have utilized this scale to measure self-regulation, metacognitive skills, and other learning strategies. Their findings indicate that the use of such scales helps in identifying strengths and areas for improvement in teacher candidates' learning processes, which in turn contributes to their professional growth.

Enhancing the learning skills of prospective teachers strengthens their pre-professional teacher identities and contributes to their professional development. Educational programs that focus on improving these skills can ensure that candidates become more equipped individuals both personally and professionally (Beijaard, Meijer & Verloop, 2004; Mockler, 2011).

2. Methodology

2.1. Research Model

This study employs a correlational survey model to assess the abilities and views of teacher candidates, utilizing the 21st Century Learner Skills Use Scale and the Pre-Professional Teacher Identity Scale. The research focuses on examining the relationship between teacher candidates' learning skills and their pre-professional teacher identity, as well as exploring potential gender differences in these variables. In this study, relationship and difference analyses were conducted. Correlational analysis was used to examine the relationship between learning skills and teacher identity. Additionally, difference analysis (specifically, independent sample t-test) was performed to determine whether there were significant differences between gender groups (female and male) in terms of learning skills and teacher identity.

2.2. Research Sample

In this research, the sample was selected using a convenience sampling method from teacher candidates enrolled in pedagogical formation programs at Kırşehir Ahi Evran University. The sample was not based on specific criteria but was chosen based on accessibility. A sample size of 306 participants is sufficient for conducting general statistical analyses, ensuring that the results can be generalized to a larger population. The study sample includes 306 teacher candidates, comprising 125 males (40.6%) and 183 females (59.4%).

Table 1. Demographic Information

Variables	Groups	n	%
Gender	Female	181	59,4
	Male	125	40,6
Preference Order	1-5	113	36,7
	6-10	126	40,9
	11-14	56	18,2
	15+	13	4,2
School Type	Anotolian	147	47,7
	Social Science	22	7,1
	Vocational	67	21,8
	İmamhatip School	41	13,3
Father's Education	Science	31	10,1
	Primary	130	38,9
	High School	99	32,1
Mother's Education	University	39	12,6
	Primary	216	70,1
	High School	71	23,1
Reasons For Choosing	University	21	6,6
	University Score	32	10,1
	Job Opportunities	36	11,4
	Interest	151	47,9
Total	Advice	52	16,5
	Family Influence	47	14,9
Total		306	100

2.3. Data Collection Tools and Procedure

The Scale that using from the research is '21st Century Learner Skills Usage Scale,' crafted by Orhan-Göksün (2016), was utilized to discern the 21st-century learning competencies of teacher candidates. This scale comprises four sub-dimensions (cognitive abilities, autonomous skills, collaboration and flexibility skills, innovation skills) and contains 31 items. The scale's items are evaluated on a five-point Likert scale ranging from 'never' to 'always'. The other scale that The 'Pre-Professional Teacher Identity Scale, created by Friesen and Besley (2013) and translated into Turkish by Arpacı and Bardakçı (2015), was employed to assess the professional identities of prospective teachers. This scale comprises 17 items. Additionally, demographic information was collected through the Personal Information Form. The data collection process was conducted in 2024 with online forms. All participants were informed about the study, and their consent was obtained before data collection.

2.4. Data Analysis

The data were analyzed using SPSS (Statistical Package for the Social Sciences) software. Table 2 presents the reliability analysis of the measures used in the study, including their descriptive statistics (mean, standard deviation, skewness, and kurtosis) and Cronbach's alpha values, which indicate internal consistency.

Table 2. Descriptive Values

Measures	Mean	sd	Skewness	Kurtosis	Cronbach alpha
Learner Skills	3.95	0.39	0.474	1.049	0.90
Teacher Identity	3.61	0.36	-0.133	1.546	0.79

Both scales exhibit satisfactory reliability, with Learner Skills demonstrating a higher internal consistency ($\alpha = 0.90$) compared to Teacher Identity ($\alpha = 0.79$). The skewness and kurtosis values suggest that both distributions are approximately normal, with Learner Skills showing a slight positive skew and Teacher Identity having a near-symmetric distribution. The t-test was used to evaluate whether there was a statistically significant difference between the male and female groups. Correlation and regression analyses were conducted to examine the relationships between teacher identity and learning skills.

2.5. Ethical

All participants were informed about the purpose of the study, the data collection process and the confidentiality policy. Participation was voluntary, anonymity and confidentiality were maintained throughout the study, ensuring that participants' identities were protected.

3. Findings

The study aimed to examine the relationship between teacher candidates' learning skills and their pre-professional teacher identity, as well as to explore potential gender differences in these variables. The findings are presented below:

Table 3. T- Test

Variables	Groups	N	M	SD	t	df	p
-Learner Skills	Female	183	3.97	.411	0,595	306	,552
	Male	125	3.94	,357			
-Teacher Identity	Female	183	3.65	0.33	2.111	306	,036
	Male	125	3.56	0.40			

There is no significant difference between women and men in terms of learning skills ($p = 0.552$). This shows that women and men teacher candidates approach learning skills in a similar way. A significant difference was found in terms of teacher identity ($p = 0.036$). Women's perception of teacher identity was found to be higher than men. This shows that women candidates may have stronger perceptions in their professional identity development.

Table 4 presents the results of the correlation analysis conducted to determine the relationship between teacher identity and learning skills of prospective teachers.

Table 4. Correlation Analysis

		Learning Skills
Teacher Identity	Pearson Correlation	0,507
	r	<0.001
	N	306

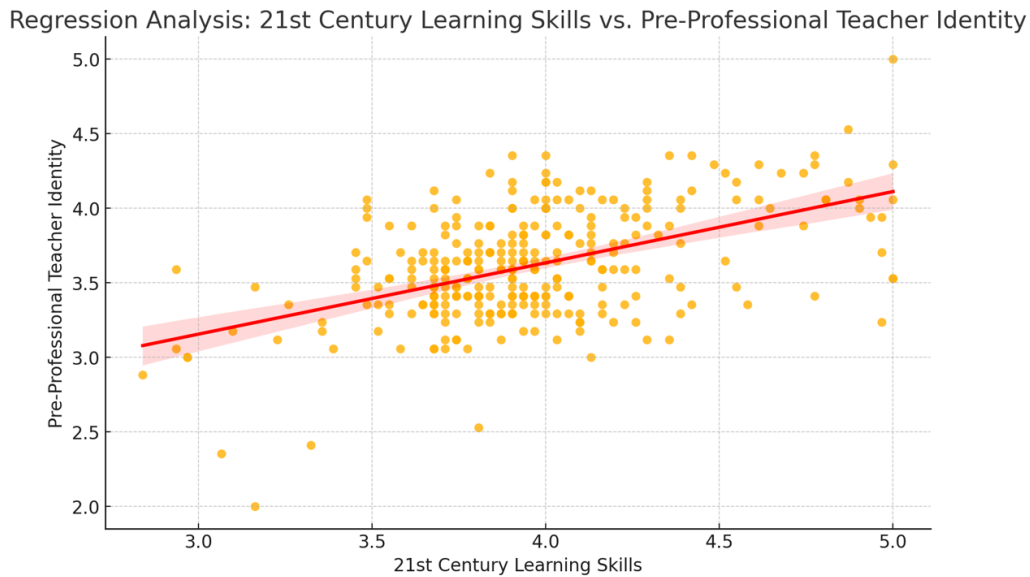
According to Table 4, a moderate and positive significant relationship was found between teacher candidates' teacher identity and learning skills ($r=0.507$; $p<.001$). This indicates that as teacher candidates' learning skills improve, their perceptions of teacher identity also tend to increase.

The findings of the simple regression analysis regarding the prediction of teacher candidate learning skills by teacher identity are shown in Table 5.

Table 5. Regression Analysis

Independent Variable	Dependent Variable	B	Std. Error	(β)	t	p	R	R ²	F	p
Constant		1.727	0.183		9.389	.000	0.507	0.257	64.49	.00
Learner Skills	Teacher Identity	0.478	0.046	0.509	10.337	.000				

These results show that there is a significant and positive relationship between 21st Century Learning Skills and Pre-Professional Teacher Identity. As teacher candidates' learning skills increase, their perceptions of teacher identity also strengthen. The findings highlight the importance of fostering both learning skills and professional identity development in teacher education programs. The model explains 25.7% of the dependent variable, and this relationship is statistically significant.



Graphics 1. 21st Century Learning Skills

This chart visually confirms that as 21st Century Learning Skills scores increase, so do Pre-Professional Teacher Identity scores.

4. Discussion and Conclusion

This study aimed to examine the relationship between 21st-century learning skills and pre-service teacher identity, emphasizing the role of learning skills in shaping professional identity. The findings revealed a moderate positive relationship between these variables ($r = 0.507$; $p < .001$), with learning skills accounting for 25.7% of the variance in teacher identity. These results suggest that skills such as critical thinking, problem-solving, digital literacy, communication, and collaboration play a fundamental role in the formation of pre-service teachers' professional identities.

These findings are in line with previous research, particularly Eđmir and Erdem (2020), who also found a moderate positive correlation between 21st-century learning skills and teacher identity, reporting that these skills explained 40% of the variance. The difference in explained variance between the two studies may stem from sample characteristics, educational backgrounds, and measurement tools used. While Eđmir and Erdem's study might have included a more diverse sample or broader operationalization of learning skills, our study's findings still reinforce the notion that learning skills significantly contribute to teacher identity formation.

Similarly, Tican and Deniz (2019) emphasized the role of teacher candidates' perceptions of 21st-century learner and teacher skills in shaping their professional identities. Their research found that as pre-service teachers engaged more actively in the learning process, collaborated effectively, and improved their digital competencies, they were more likely to adopt professional roles. This aligns with our findings, which suggest that developing awareness of one's own learning process fosters professional identity development. Both studies underline the importance of bridging the gap between learning and teaching competencies within teacher education programs.

Furthermore, Gökşün (2016) investigated the connection between learner skills and teaching skills, demonstrating that learning competencies directly influence instructional abilities. While Gökşün's study focused on the transition from learning to teaching, our research specifically examined the impact of learning skills on the identity formation process. Another methodological difference is that Gökşün employed structural equation modeling for a more holistic analysis, whereas our study used regression analysis to assess the predictive role of learning skills. These distinctions highlight the multidimensional nature of teacher identity development, indicating that both teaching skills and personal learning experiences are essential in this process.

Additionally, Çelik and Kalkan (2019) explored teacher candidates' professional preparation levels, attitudes toward teaching, and factors influencing their perceptions at Pamukkale University. Their study focused on

demographic factors, such as gender, academic background, and program type, whereas our study examined cognitive and pedagogical factors influencing teacher identity. This contrast suggests that teacher identity formation is shaped by both individual/demographic and pedagogical/cognitive variables. Understanding identity development from these different perspectives provides a more comprehensive framework for teacher education.

Although this study provides valuable insights into the role of 21st-century learning skills in professional identity formation, it has several limitations. First, the research sample consists solely of 306 teacher candidates from Kırşehir Ahi Evran University, which may limit the generalizability of the findings to different institutions and regions. Future research should include a more diverse sample to explore variations in teacher identity across different educational contexts. Second, while the 21st Century Learning Skills Scale and Professional Identity Scale are reliable and valid instruments, they may not fully capture the complexity of the measured constructs. Incorporating qualitative methods, such as interviews and reflective journals, could provide a more nuanced understanding of the interplay between learning skills and teacher identity. Finally, self-reported data may introduce social desirability bias, affecting the accuracy of responses. Future studies could use observational or longitudinal methods to track the development of teacher identity over time.

Overall, this study reinforces the idea that 21st-century learning skills play a pivotal role in the development of pre-service teachers' professional identity. The findings align with existing literature while offering a distinct perspective on how cognitive and pedagogical skills contribute to teacher identity formation. Future research should integrate both quantitative and qualitative approaches to provide a more comprehensive analysis of this phenomenon. Moreover, teacher education programs should emphasize experiential learning, mentorship, and reflective practices to help candidates effectively integrate learning skills into their professional identity development.

5. Recommendations

This study examines the relationship between pre-service teachers' 21st century learning skills and their pre-professional teacher identities and offers various opportunities for future research. In order to evaluate the formation process of teacher identity and the impact of learning skills on this process more comprehensively, it is recommended to examine different variables. In particular, comparing teacher candidates in different geographical regions will make an important contribution to understanding the effects of education systems, cultural factors, and socio-economic conditions on teacher identity. However, the effects of more diverse demographic variables such as socio-economic status, family structure, and cultural background on learning skills and teacher identity should be examined in detail.

Longitudinal studies should be conducted to understand the dynamic structure of teacher identity development. How teacher identity is shaped during undergraduate, graduate, and in-service education processes, how teacher candidates' professional perceptions evolve, and how they adopt 21st century skills should be followed over time. Such studies will contribute to the development of more sustainable educational policies for teacher training processes by revealing how teacher identity develops in the long term. In addition, qualitative research should be conducted on the learning skills and identity development of teacher candidates, and the experiences, thought processes and professional identity formations of teacher candidates should be examined in depth, especially by using interview, observation and journaling methods.

Teacher education programs need to be restructured to provide 21st century learning skills more effectively. In this context, it is important to update the curriculum for teacher candidates to include critical thinking, problem solving, collaboration, digital literacy, communication and self-regulation skills. In order to enable teacher candidates to develop these skills in practice, innovative teaching methods such as problem-based learning, collaborative learning, the flipped classroom model and game-based learning should be integrated into teacher education programs. Collaboration between education faculties and practice schools should be increased, and teacher candidates should be provided with early classroom experience. Long-term and structured teaching internships will support teacher candidates' professional identity development and increase their awareness and self-confidence about their profession.

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