Linguistic and Philosophical Investigations
ISSN: 1841-2394, e-ISSN: 2471-0881
Vol 23 (1), 2024
pp. 145–166

The Role of Professional Self-efficacy as a Mediating Variable between Professional Identity and the Attitude Towards Using Technological Innovations among Teachers

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Abstract: This research paper aimed to identify the role of professional self-efficacy as a Mediator variable between the relationship between professional identity and the attitude towards using technological innovations in the educational process for teachers. The sample consisted of (217) teachers in the Kingdom of Saudi Arabia. It used the descriptive analytical approach, the statistical analysis program (AMOS 24), and many tools, including the professional identity scale, the professional self-efficacy scale, and the attitude towards using technological innovations in education scale. The results revealed that professional identity affects the attitudes towards using technological innovations, and professional self-efficacy affects professional identity and the attitude towards using technological innovations. Finally, these results supported the validity of the proposed research model in that professional self-efficacy represents the mediating role in the relationship between professional identity and the attitude towards using technological innovations among teachers..

Keywords: Professional Self-efficacy, Professional Identity, Attitude towards Using Technological Innovations, Teachers.

Received: 25 May 2024 **Revised:** 29 June 2024 **Accepted:** 16 July 2024

1. Introduction

We are now witnessing an increasing interest in the importance of technological innovations in various fields of life, as they serve as a catalyst that always leads to progress, synonymous with development and survival, and a basic engine for educational and economic productivity, social progress, and human achievement (Abbasi et al., 2019).

Integrating technological innovations into the educational process has become a global trend, and interaction with teaching and learning activities through these innovations has become a motivation for learning, providing vital elements for virtual learning environments, and permanent communication between the teacher and the learner (Yulia, 2020). Technological-innovations based Education represents a major challenge for knowledge-based societies in the digital age; it is ideal for self-learning (Birte & David, 2020).

Developing education requires introducing technological innovations into the educational process and using them in developing innovative and critical thinking skills, improving achievement, increasing human experience, forming minds capable of solving problems, and building digital learning environments (Pena-Bandalaria, 2007). In addition, no change can be made in the educational process without developing the

teacher, and developing the teacher's ability to use technological innovations is an important aspect of his professional development to change and develop the teaching and learning processes. There is a consensus among policymakers that the teacher plays a critical role in educational systems, their success or failure depends on the quality of the teacher's performance in their jobs, and they are the guarantee of effective teaching and learning (Tschannen-Moran & Woolfolk-Hoy, 2001).

In the terms that technological innovations affect teaching practices, the success of the teacher in performing his role effectively requires the ability to deal with technological innovations, have sufficient cognitive readiness, and skill and have a positive attitude towards using them in teaching (Hammond et al., 2014). These technological innovations manage the teacher to have new teaching possibilities and give him access to interactive and multimedia materials on the Internet (Korenova, 2016).

Among the factors influencing teachers' use of technological innovations are their attitudes toward using them in teaching, as they are among the factors influencing teachers' emotions and beliefs, they direct their behavior towards integrating these innovations into the educational process, and benefiting from them in improving educational outcomes (Kılınç et al., 2016). Thus, it becomes important to know the attitudes of teachers towards using technological innovations in the educational process to determine their behavior, actions, and decisions towards technological innovations based Education, and to determine the extent to which they accept using these innovations in education, which in turn is reflected in improving their teaching performance. Therefore, understanding teachers' attitudes is essential because it is one of the most important elements of technology integration (Kim et al., 2013).

The research showed that one of the reasons for not using technology innovations in education is the negative beliefs and attitudes of teachers towards technology. To understand teaching practices, teachers' beliefs and attitudes towards using technology in teaching should be studied and examined because it is an indicator of many behaviors in the learning environment (Aldunate & Nussbaum, 2013). The attitude corresponds to a set of beliefs and feelings that lead to assertive behavior that appears in human practice (Nocetti et al., 2020). The researchers indicate that personal factors such as self-efficacy have an impact on teachers' attitudes towards using technological innovations in education (Özyıldırım Gümüş et al., 2021).

Professional self-efficacy is an important construct that has a significant impact on the teacher's motivation, personal achievements, cognitive processes, and emotional motives. It is an important variable for predicting the teacher's behavior in the teaching situation and determines the amount of effort that he will make in teaching and his insistence on facing the challenges and difficulties of the teaching situation (Nikoçeviq-Kurti, 2022; Bandura, 1977). The interest in the professional self-efficacy of the teacher comes as a result of the vital role he plays in the teaching and learning process, as one of the main reasons affecting the progress of any educational system is the highly qualified teachers, who have some distinctive characteristics; the high self-efficacy is one of these qualities (Shaukat & Iqbal, 2012).

In educational environments, especially those enhanced by technological innovations, the teacher's professional self-efficacy can be conceived as the teacher's belief in his ability to plan, organize, and implement the activities required to achieve educational goals (Skaalvik & Skaalvik, 2010). It is the individual's belief in his abilities that contribute to achieve success in the workplace, affects his perceptions of the interaction of technological innovations with learning materials, and enhances his efficiency in using Technology during teaching (Cardullo et al., 2021).

Since the profession is linked to the individual's self-esteem, it gives meaning to life and helps him grow and reach self-realization; Achieving the professional self-concept is the essence of the process of professional growth and building a professional identity (Zhang, et al., 2021, Kelley et al., 2020) because it enhances the individual's sense of satisfaction and makes him more integrated in the workplace. The professional self is the teacher's perception of his profession as appropriate to his abilities and desires. It helps him succeed in his profession and performance and improve his skills in teaching to achieve compatibility, professional growth, and build a professional identity)Ballout, 2009). Thus, professional self-efficacy is a powerful factor that has a direct impact on professional performance, the workplace, and psychological and social well-being and provides him with capabilities and resources to improve his

achievements (Bernales-Turpo et al., 2022).

Studies have reported that the high self-efficacy of teachers affects their professional behaviors (George et al., 2018), and plays an important role in professional development and building professional identity (Mei et al., 2022; Hajovsky et al., 2020), Professional identity is highly related to self-efficacy and is one of the most important factors in Education and career development of teachers (Guo et al., 2017). It is viewed as the process of integrating a teacher's personal knowledge, beliefs, attitudes, norms, and values into teaching (Beijaard et al., 2004).

In general, it is important to study the effect of potential relationships between professional self-efficacy, professional identity, and the attitude towards using technological innovations in teaching and to explore the mediating role of professional self-efficacy in building professional identity and the attitude towards using technological innovations in teaching. Thus, the study questions are determined in:

1. What is the impact of professional identity on attitudes towards using technological innovations among teachers in the Kingdom of Saudi Arabia.
2. What is the impact of professional identity on professional self-efficacy among teachers in the Kingdom of Saudi Arabia.
3. What is the impact of professional identity on professional self-efficacy among teachers in the Kingdom of Saudi Arabia.
4. What is the impact of professional self-efficacy on attitudes towards using technological innovations among teachers in the Kingdom of Saudi Arabia.
5. Does professional self-efficacy mediate the relationship between professional identity and attitudes towards using technological innovations among teachers in the Kingdom of Saudi Arabia.

Theoretical Overview of the Main Concepts

Conceptual Framework and Constructive Assumptions Development "Research Model"

Technological innovations and their impact on the educational process

Recent years have witnessed rapid and remarkable development in technology (for example educational robots) that could have far-reaching consequences for educational systems (Kwon et al., 2017). Technology has become part of our daily life and one of the main components of education (Cener et al., 2015). The combination of technological development and change in the nature of knowledge have profoundly affected the teaching and learning processes (Macleod & Sinclair, 2015).

Technological innovations are defined as creative solutions to education problems, expanding opportunities, and increasing efficiency and effectiveness in a manner consistent with the nature of the information age (KilinÇ et al., 2016). It is also defined as everything that is new and modern that results from the perfect application of computer technology, multimedia, distance education, and the associated materials, technological programs, communication channels, networks, and devices for transferring, processing, storing, and retrieving data and information to achieve educational goals (Rogers, 2003).

The importance of technological innovations in the field of education comes as it prepares the learner for the labor market by increasing motivation, enhancing self-learning and higher-order thinking skills, developing the ability to discover phenomena and deeply understand them, and focusing on the problem. It also allows the teacher to improve the quality of teaching and use teaching strategies more effectively by integrating digital technology into it (Korenova, 2016; Teo et al., 2008). The benefits of using technological innovations were identified in overcoming the shortcomings of traditional teaching, allowing the teacher to integrate multimedia, sharing information and ideas quickly and easily, removing the restrictions of time and space, providing the learner with a creative learning experience, enhancing his research skills, independent learning, and problem-solving, and practicing self-regulated learning, participation, thinking, and contributing to learning (Mason & Rennie, 2008).

Attitudes towards using technological innovations in education

Attitude is a psychological concept that has mental, cognitive, and psychological-emotional roots and manifestations; It is an essential component of an individual's personality and perceptions (Perloff, 2017).

It also represents a tendency to respond with approval or rejection towards a specific situation (Oskamp and Schultz, 2005). Ahmed (2015) agrees that it is the set of positive, negative, and neutral emotions that can effectively enhance or hinder the learning process.

The research indicated the importance of the availability of attitudes towards using technological innovations in education. Sugar et al., (2005) pointed out the importance of positive attitudes among teachers towards using technological innovations in teaching, as they help the teacher to adapt to real life and build academic and professional compatibility, which is reflected in his performance in the profession in the future (Mamlok-Naaman, 2011). Dara and Charles (2011) argue that teacher attitudes have an impact on teacher qualification and occupational aspiration.

Al-Asmari (2005) indicated that there is a weakness in the attitudes of faculty members towards using technological innovations. According to Hew & Brush (2007), negative attitudes of teachers towards technology may be a major obstacle to integrating technology, while Sarah et al. (2015) indicated that the success and continuity of e-learning depend on teachers' positive attitudes towards using technology innovations and their applications more than the existence of technology itself, Vanessa et al., (2018) indicated that there is a positive relationship between teachers and learners' attitudes towards using technology and its applications; as teachers' confidence and positive attitudes affect directing learners' interest towards using technology and its applications, and Davidovitch & Yavich (2021) also indicated that teachers have more positive general attitudes towards using tablets as an integral part of the educational process.

Professional Identity

Teachers' professional identity is one of the most important issues in educational systems around the world due to its significant impact on expectations, teacher performance, and educational quality, as it allows individuals to have the ability to deal with increasingly complex problems in complex work environments (Sawatsky et al., 2020).

Professional identity relates to the teacher's self-perception of his profession and his professional responsibilities based on his experiences, views, and beliefs (Han, 2016). It is the set of attitudes, values, knowledge, beliefs, and skills shared with others within a professional group (Adams et al., 2006). It expresses the teacher's understanding of situations related to education and relationships that appear in practical professional activities (Timoštšuk and Ugaste, 2010). It is a continuous and self-directed process aimed at developing the growth of the teacher's ideas, actions, and feelings, in which basic characteristics, values, and criteria are understood (Wald, 2015). Professional identity is a structure with a multiple, dynamic, and changing nature and teachers must be exposed to teaching experiences that contribute to build their professional identity (Ortaçtepe, 2015). It affects teacher behavior (Abednia, 2012) and determines his interpretations of learners' behavior; it also influences strategies, models, and teaching methods (Caihong, 2011), associated with effective teaching (Ivanovaa and Skara-Mincłne, 2016), and affects pedagogical practices (Gathondu et al., 2022).

According to Beijaard et al., (2004), teachers' professional identity is a continuous process of interpretation and reinterpretation of experiences, a dynamic phenomenon that continues to be developed from university studies to working life (De Lasson et al., 2016). Boak et al. (2020) confirmed that the teacher's professional identity determines his attitudes, convictions, actions, and reactions. It also enhances his ability to play an essential role in quality teaching, professional development, and building a successful long-term teaching career (Veisson & Kabaday, 2018), Knowing pedagogical content (Atai & Khazaee, 2014), examining different aspects of teaching (Beauchamp & Thomas, 2009), adopting a learner-centered instructional approach (Li et al., 2019), and being able to form a value system about how to understand one's roles or how to exist in school or society (Beauchamp and Thomas, 2009). It enhances teachers' self-view and continuous interaction with the teaching context positively (Beijaard et al., 2004), enjoys better relationships with learners, and is more effective in teaching, understanding learners' needs, solving problems, transferring knowledge, and enhancing learner independence (Yazdani & Ghasedi, 2021).

Moore and Hofman (1988) indicated that the higher the professional identity of teachers, the lower the

degree of job dissatisfaction and work stress. Veisson and Kabaday (2018) also indicated that the lower the professional identity of the teacher, the lower the quality of his teaching. It was also found that the lack of clarity of professional identity has a significant impact on the perceived value of the profession and on the teacher's confidence in defending their professional opinions and in instilling appropriate professional knowledge, skills, and values in their students (Sundberg et al., 2017; Turner & Knight, 2015). Therefore, novice teachers need to feel their professional identity to better understand the foundations of their behavior and beliefs (Pillen et al., 2013). Whereas teachers who are more successful in understanding and adjusting their identities as teachers may be more willing to persevere (Titu, 2019). The challenges of using technological innovations lie in teachers, as social networks and digital platforms promote new content and new educational patterns, and the importance of artificial intelligence as an educational agent is increasing (Minea-Pic, 2020), which poses a challenge in defining and adopting new roles for teachers; which can influence the development of their professional identity or help develop a strong identity. A narrow perspective that does not take into account the current challenges of the teaching profession associated with technological innovations can prevent the development of a rich and multifaceted identity that includes the different roles and tasks that teachers do today (Murray, 2020; Sachs, 2016).

Therefore, it is important to provide adequate support to the teacher to develop a strong professional identity, which allows him to respond and change flexibly (Sachs, 2016), and enhance his self-efficacy, confidence when doing his work, positive behavior, professional commitment, functional involvement in integrating technological innovations into education, and improving his technical performance as important parts of his professional identity and having a significant impact on student performance (Zhang et al., 2021; Day et al., 2005). Therefore, the research tested the following hypothesis:

H1: ***The professional identity affects the attitudes towards using technological innovations among teachers in the Kingdom of Saudi Arabia.***

The Moderating Role of Professional Self-Efficacy

The teaching profession plays an important role in the teacher's life, whether on the psychological, social, or economic level. It forms his psychological structure and leads to a feeling of job satisfaction, especially if it is commensurate with his tendencies and abilities. The teacher's professional self-efficacy represents his beliefs about being able to perform teaching behavior (Pecháčková et al., 2014).

Professional self-efficacy is one of the cognitive factors affecting the development of the individual's interest and goals in the field of career exploration and decision-making (Betz et al., 1996). It is a variable predictive of professional identity, behavior, and professional decision-making (Abednia, 2012). It is an indicator of the teacher's confidence in his ability to perform the behavior and form positive values and attitudes towards work (Hackett & Betz, 1981), it has a significant impact on Cognitive, motivational, affective, and elective processes (Bandura et al., 1996). In addition, that professional self-efficacy makes the teacher more persistent in achieving learning goals when faced with obstacles and more willing to take risks in the classroom (Sarfo et al., 2015). Granziera and Perera (2019) suggested that a teacher with high professional self-efficacy is more likely to feel engaged with students and experience more job satisfaction.

The radical changes taking place in education as a result of the integration of technological innovations within it require a teacher, who can keep pace with developments in educational technologies, and thus the teacher's professional self-efficacy plays a role in determining his behavior towards technology (Papa, 2010). The teacher needs to have a high degree of professional self-efficacy because learning how to integrate technology into the educational process requires self-confidence and self-efficacy (Banoglu et al., 2015). Scientists attribute the teacher's beliefs about integrating technological innovations into the educational process and knowing how to properly use them to his perceptions of self-efficacy (Teo et al. 2008), which enhance his stability when facing technological challenges and strengthen his motivation to perform some behaviors in teaching such as using digital educational materials (Glackin & Hohenstein, 2018).

Many studies have indicated the importance of professional self-efficacy in developing professional practice and enhancing personal traits such as openness and conscientiousness (Gori et al., 2021),

improving student learning (Hajovsky et al., 2020; Kelley et al., 2020), improving job satisfaction (Bargsted et al., 2019; Yao et al., 2018), achieving psychosocial and social well-being and realizing the challenge, affecting work environment perception and job involvement, developing the motivational process, mitigating some of the consequences of job stress (Ventura et al., 2015), building professional identity and professional commitment (Mei et al., 2022; Zhang et al., 2021; Shen et al., 2020; Qiu et al., 2019), enhancing self-confidence in facing great challenges and overcoming professional difficulties (Xiong et al., 2020), promoting flexibility as the strongest indicator of professional identity (Zhang et al., 2021; Bhattarai et al., 2020; Rees et al., 2015), and are positively associated with mentoring experience during teaching practicum (Nikoçeviq-Kurti, 2022). Therefore, self-efficacy was included as a possible factor affected by professional identity (Chen et al., 2020).

On the basis that no experimental study has examined the mediating role of professional self-efficacy in the relationship between professional identity and the attitude towards using technological innovations in the educational process of teachers, the research sought to examine the mediating role of professional self-efficacy between the independent and dependent variables of the study, by testing the following hypotheses:

H2*: The Professional identity affects the professional self-efficacy among teachers in the Kingdom of Saudi Arabia.*

H3: *The Professional self-efficacy affects the attitude towards using technological innovations among teachers in the Kingdom of Saudi Arabia.*

H4: *The Professional self-efficacy mediates the relationship between professional identity and the attitude towards using technological innovations among teachers in the Kingdom of Saudi Arabia.*

The following figure shows the research model:.

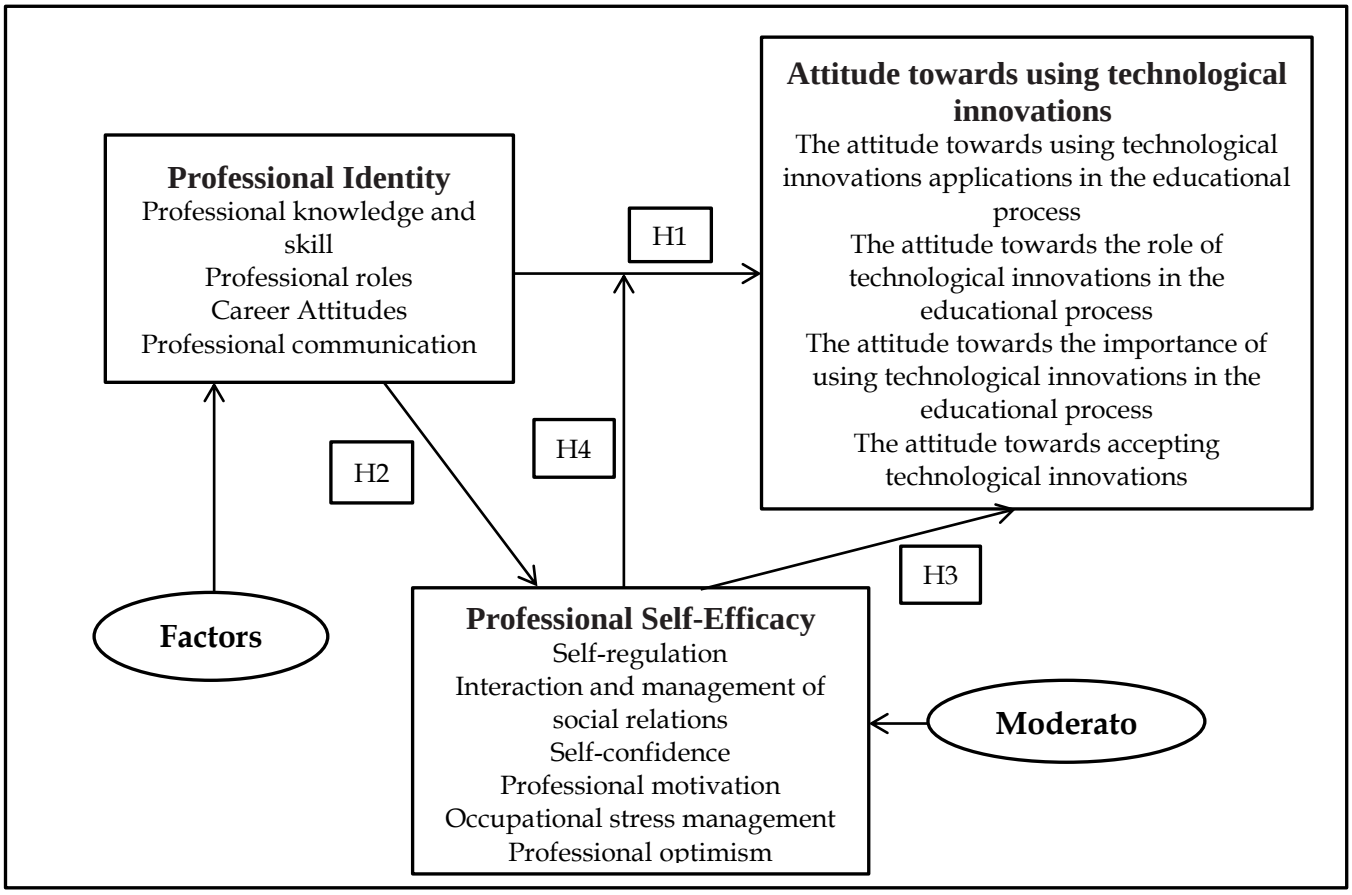

Figure 1. Proposed research model

2. Methodology

The analytical descriptive approach was used, which describes the phenomenon and classifies and organizes information as suitable for the nature and the objectives of the research in finding the relationships between the variables of the research, as well as checking the direct and indirect effects between the variables.

Sample

The research sample consisted of (217) teachers in the Kingdom of Saudi Arabia. This research adopted a non-random sampling method (i.e. appropriate sampling) to collect data. The average age of the teachers was 31.8 (standard deviation = 23), and their ages ranged between 26 and 44 years. The sample received the research tools to respond to via the Internet.

Instruments and Data analysis

*** The Scale of Attitudes Towards Using Technological Innovations in Education (ATUTI)**

The scale was prepared after reviewing the related literature and studies such as (Davidovitch & Yavich, 2021; Papadakis et al., 2021; Vanessa et al., 2018; Silva, 2018; Sarah et al. 2015; Mai 2015). it aimed to reveal the teachers' attitudes towards using technological innovations in education. In its initial form, the scale consisted of (25) statements divided into three sub-dimensions: The attitude towards using technological innovations applications in the educational process (UTIA), The attitude towards the importance of using technological innovations in the educational process (IUTI), The attitude towards accepting technological innovations (ATI), and the response was estimated on a five-point Likert scale (1-5). The face validity of the scale was verified by presenting it to a panel of specialists in psychology and educational technologies (Johnson, 2021); to express their opinions on the scientific and linguistic intelligibility of the tool, its suitability for the purpose, its importance, the extent to which the statement relate to the dimensions to which they belong, in addition, suggesting addition, deletion or modification of the statement. Some modifications were made according to their comments, which were limited to rephrasing some statements.

the confirmatory factor analysis of the scale was conducted to the scale of attitude towards using technology by the path analysis method using the (Amos 24) program on a sample of (217) teachers to ensure the constructive validity of the scale. It was assumed that all the observed variables represented in the items of the scale gather around three latent factors, which are the attitude towards using technological innovations applications in the educational process (UTIA) (5 items), The attitude towards the importance of using technological innovations in the educational process (IUTI) (5 items), The attitude towards accepting technological innovations (ATI) (4 items). Figure 2 shows the path analysis of the relationships between the factors of the attitudes towards using technological innovations.

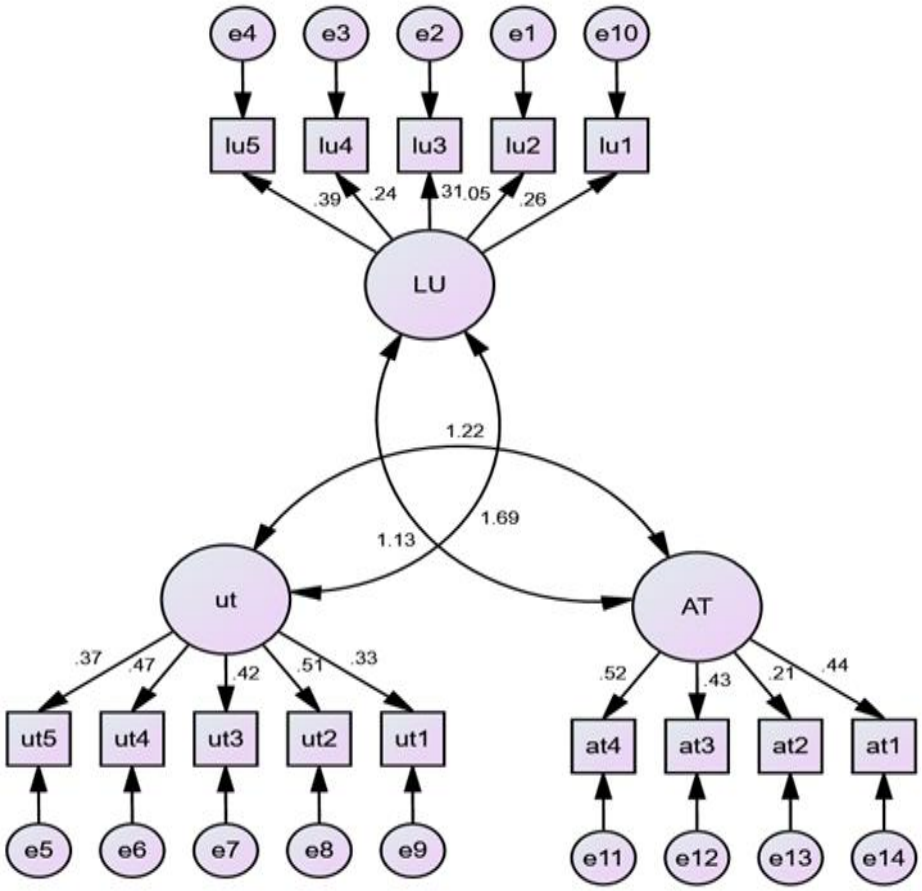

Fig. 2. SEM for Professional attitude towards using technological innovations and its factors

Figure 2 showed that there are positive correlation coefficients between the items and the factors to which they belong and between the factors and each other.

*** Professional Identity Scale (PI)**

The scale was prepared after reviewing the related literature and studies such as (Zhang et al., 2021; Yazdani & Ghasedi, 2021; Sundberg et al., 2017; Sachs, 2016; Turner & Knight, 2015). The scale aimed to reveal the professional identity of the teachers. In its initial form, the tool consisted of (20) statements divided into three dimensions Professional knowledge and skill (PKS); Career Attitudes (CA), and Professional Communication (PC). The response was estimated on a five-point Likert scale (1-5). The face validity of the scale was verified by presenting it to a panel of specialists in psychology and educational technologies (Johnson, 2021); to express their opinions on the scientific and linguistic intelligibility of the tool, its suitability for the purpose, its importance, the extent to which the phrases relate to the dimensions to which they belong, in addition, suggesting addition, deletion or modification of the statements Some modifications were made according to their comments, which were limited to rephrasing some statements. The confirmatory factor analysis of the professional identity scale was conducted by using the path analysis method using the (Amos 24) program on a sample of (217) teachers. It was assumed that all the observed variables represented in the items of the scale gathered around three latent factors, which are professional knowledge and skill (PKS) (3 items); Career Attitudes (CA) (4 items), Professional Communication (PC) (3 items).

Figure 3 illustrates the path analysis of the relationships between the factors of professional identity.

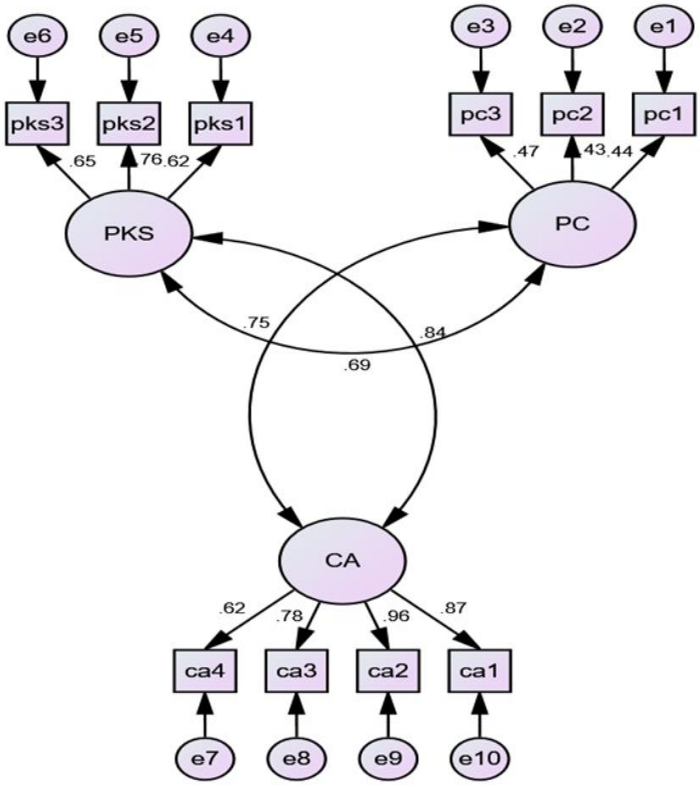

Fig. 3. SEM for Professional Identity and its factors

Figure 3 shows that there are positive correlation coefficients between the items and the factors to which they belong and between the factors and each other.

***Professional Self-Efficacy Scale (PSE)**

The scale was prepared after reviewing the related literature and studies such as (Mei et al., 2022; Nikoçeviq-Kurti, 2022; Gori et al. 2021; Hajovsky et al., 2020; Chen et al., 2020; Kelley et al., 2020; Shen et al., 2020; Bargsted et al., 2019; Qiu et al., 2019). The scale aimed to reveal the professional self-efficacy of teachers. In its initial form, the tool consisted of (24) statements divided into four dimensions, Self-regulation (SR), Interaction and management of social relations (IMSR), Occupational stress management (OSM), Professional optimism (PO). The response was estimated on a five-point Likert scale (1-5). The face validity of the scale was verified by presenting it to a panel of specialists in psychology and educational technologies (Johnson, 2021); to express their opinions on the scientific and linguistic intelligibility of the tool, its suitability for the purpose, its importance, the extent to which the phrases relate to the dimensions to which they belong, in addition, suggesting addition, deletion or modification of the statements Some modifications were made according to their comments, which were limited to rephrasing some statements. The confirmatory factor analysis of the Professional Self-Efficacy Scale was conducted by using the path analysis method using the (Amos 24) program on a sample of (217) teachers. It was assumed that all the observed variables represented in the items of the scale gathered around four latent factors, which are Self-regulation (SR) (4 Items), Interaction and management of social relations (IMSR) (3 Items), Occupational stress management (OSM) (4 Items), Professional optimism (PO) (5 Items).

Figure 4 illustrates the path analysis of the relationships among the factors of professional self-efficacy.

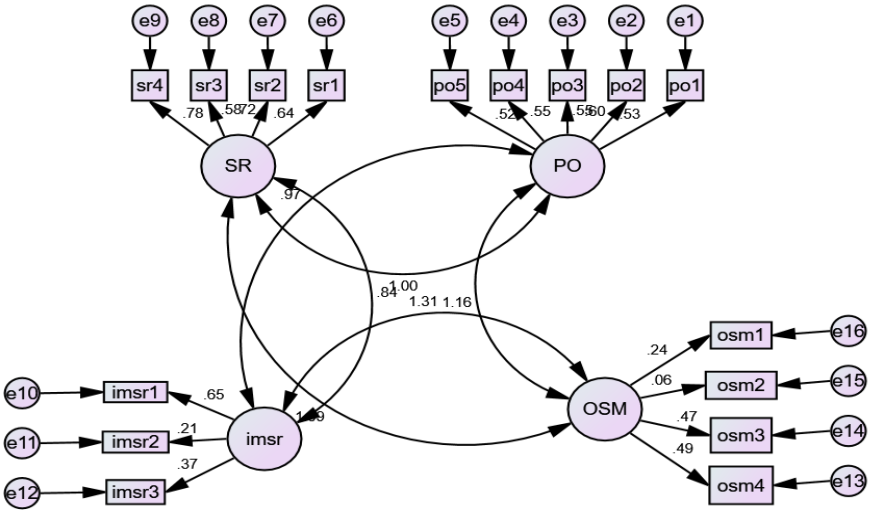

Fig. 4. SEM for Professional Self-Efficacy and its factors

Figure 4 shows that there are positive correlation coefficients between the items and the factors to which they belong and between the factors and each other.

3. RESULTS

To verify the proposed research model that illustrates the influence relationships within the framework of the existing relationships between the research variables, the study tools were applied to a sample of 217 teachers, and the multi-group Path Analysis modeling method was used through the Amos 24 program. Figure 5 shows the Final Path analysis Model

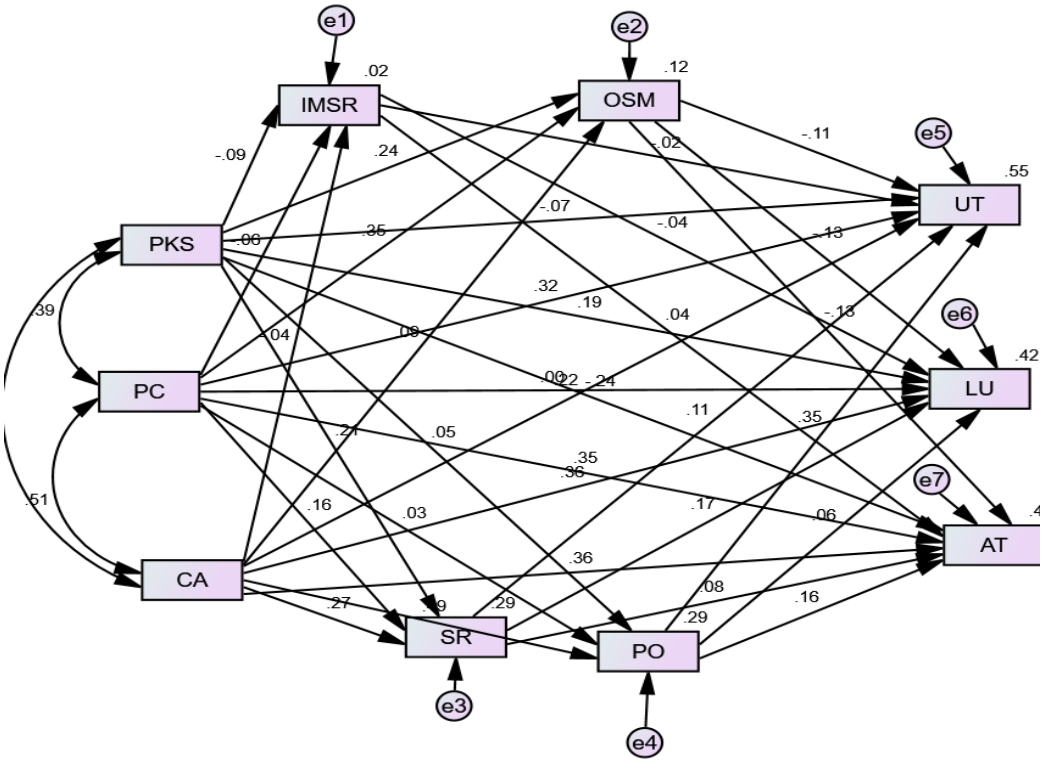

Fig. 5. Path analysis model for independent Variables

Figure 5 shows that there are positive and negative correlations between the factors constituting the

research variables. Table 1 shows the regressive values of the research variables and their significance level.

Table 1. Regressive Values of the Measured Variables of Independent Variables and Its Significance Level

independent	direction	latine	Estimate	S.E.	C.R.	P
OSM	<---	PKS	.237	.018	3.602	***
OSM	<---	PC	-.350	.017	-5.991	***
PO	<---	PC	.025	.088	.479	.632
SR	<---	CA	.268	.073	4.257	***
PO	<---	CA	.491	.054	7.803	***
IMSR	<---	PC	-.056	.014	-.919	.358
SR	<---	PC	.164	.119	3.126	.002
PO	<---	PKS	.053	.089	.902	.367
SR	<---	PKS	.210	.120	3.553	***
IMSR	<---	PKS	-.094	.014	-1.359	.174
OSM	<---	CA	.095	.011	1.347	.178
IMSR	<---	CA	-.036	.008	-.486	.627
UT	<---	IMSR	-.021	.248	-.583	.560
IU	<---	IMSR	-.042	.238	-1.007	.314
AT	<---	IMSR	.043	.226	1.070	.285
UT	<---	OSM	-.106	.194	-2.784	.005
IU	<---	OSM	-.125	.187	-2.887	.004
AT	<---	OSM	-.134	.177	-3.158	.002
UT	<---	SR	.112	.028	2.641	.008
IU	<---	SR	.168	.027	3.485	***
AT	<---	SR	.083	.026	1.767	.077
UT	<---	PO	.351	.038	8.263	***
IU	<---	PO	.058	.037	1.200	.230
AT	<---	PO	.163	.035	3.449	***
UT	<---	PKS	-.066	.067	-1.344	.179
IU	<---	PKS	.186	.064	3.332	***
AT	<---	PKS	-.236	.061	-4.337	***
UT	<---	PC	.321	.068	7.237	***
IU	<---	PC	.003	.065	.069	.945
AT	<---	PC	.351	.062	7.102	***
UT	<---	CA	.221	.043	3.983	***
IU	<---	CA	.359	.042	5.665	***
AT	<---	CA	.364	.040	5.880	***

Table 2 also shows the values of the direct and indirect effects of the research variables on the research sample (N = 217).

Table 2. Standardized Effects (Group number 1 - Default model)

	Direct Effects							Indirect Effects						
	PC	CA	PKS	IMSR	SR	PO	OSM	PC	CA	PKS	IMSR	SR	PO	OSM
IMSR	-.056	-.036	-.094	0	0	0	0	0	0	0	0	0	0	0
SR	.164	.268	.210	0	0	0	0	0	0	0	0	0	0	0
PO	.025	.491	.053	0	0	0	0	0	0	0	0	0	0	0

	Direct Effects							Indirect Effects						
	PC	**CA**	**PKS**	**IMSR**	**SR**	**PO**	**OSM**	**PC**	**CA**	**PKS**	**IMSR**	**SR**	**PO**	**OSM**
OSM	-.350	.095	.237	0	0	0	0	0	0	0	0	0	0	0
AT	.351	.364	-.236	.043	.083	.163	-.134	.062	.088	-.010	0	0	0	0
IU	.003	.359	.186	-.042	.168	.058	-.125	.075	.063	.013	0	0	0	0
UT	.321	.221	-.066	-.021	.112	.351	-.106	.065	.193	.019	0	0	0	0

Table 2 shows that there are negative effects of PC on OSM & IMSR, PKS on IMSR, UT & AT, CA on IMSR, IMSR on UT & IU, OSM on UT, At & IU.

First: The effects of professional identity on the attitude towards using technology

It is clear from Table 2 that:

- There are direct positive effects of professional identity dimensions (PC, CA) on the factors of attitude towards using technology (UT, IU, AT), while the (PKS) dimension has a positive effect on (IU) and a negative effect on both (IU, AT).
- There are positive indirect effects of professional identity dimensions (PC, CA) on the factors of attitude towards using technology (UT, IU, AT), there are positive indirect effects of professional identity dimensions (PKS) on the factors of attitude towards using technology (UT, IU), and a negative effect of professional identity dimensions (PKS) on (AT).

Hence, the first hypothesis is accepted which states, "professional identity affects the attitudes towards using technological innovations among teachers in the Kingdom of Saudi Arabia (H1)".

Second: The effects of professional identity on professional self-efficacy:

It is clear from Table 2 that:

- There are direct negative effects of the professional identity dimensions (PC, CA, PKS) on the professional self-efficacy dimension (IMSR), and positive effects on each of (SR, PO), while there are positive direct effects for each of (CA, PKS) on (OSM), and a negative direct effect of the (PC) dimension on (OSM).
- There are no indirect effects of the dimensions of professional identity on the dimensions of professional self-efficacy.

Hence, the second hypothesis is accepted which states, "professional identity affects the professional self-efficacy among teachers in the Kingdom of Saudi Arabia (H2)".

Third: The effects of professional self-efficacy on the attitude towards using technology

It is clear from Table 2 that:

- There are direct positive effects of the dimensions of professional self-efficacy (SR, PO) on the factors of the attitude towards using technology (UT, IU, AT), while the dimension (OSM) has a negative effect on (IU) and a negative effect on the factors of the attitude towards using technology (UT, IU, AT). There are direct negative effects of the dimension of professional self-efficacy (IMSR) on the factors of the attitude towards using technology on each (IU, UT).
- There are no indirect effects of the dimensions of professional self-efficacy on the dimensions of the attitude towards using technological innovations.
- Hence, the third hypothesis is accepted which states, "Professional self-efficacy affects attitudes towards using technological innovations among teachers in the Kingdom of Saudi Arabia (H3)".

Fourth: The mediating effect of the professional self-efficacy of the relationship between professional identity and the attitude towards using technological innovations

Figure 5 shows the constructive model of the path analysis of the research variables. It is clear from Table 2 that professional identity affects professional self-efficacy, which in turn affects the attitude towards

using technological innovations, and then the fourth hypothesis is accepted which states, "Professional self-efficacy mediates the relationship between professional identity and the attitude towards using technological innovations among teachers in the Kingdom of Saudi Arabia (H4)."

4. Discussion

First: The effects of professional identity on the attitudes towards using technological innovations among teachers in the Kingdom of Saudi Arabia (H1)

The results in Table 2 show that teachers' professional identity plays a significant role in the teacher's performance, allowing them to deal with many increasingly complex problems in complex work environments such as using technological innovations (Sawatsky et al., 2020), deal with their applications in education, and expressing his understanding of the situations related to education and the relationships that appear in practical professional activities (Timoštšuk and Ugaste, 2010) and his awareness of the importance of using technological innovations in education, the development of his thoughts, actions and feelings to understand and accept technological innovations (Wald, 2015; Abednia, 2012), and improve the way to use these innovations (Caihong, 2011) and enhancing effective educational practices (Gathondu et al., 2022), including using technological innovations in education.

This result is supported by Beijaard et al., (2004) in that the teacher's professional identity is responsible for being active in the educational process and integrating his knowledge, attitudes, and beliefs about teaching and its related technology (Beijaard et al., 2004). It is supported by Boak et al. (2020) that the teacher's professional identity determines his attitudes, convictions, actions, and reactions towards everything related to the teaching profession; Including using technological innovations in education. It is also supported by the view of many researchers that the teacher's professional identity enhances the ability to play a fundamental role in the quality of teaching (Veisson & Kabaday, 2018), which is evident in the attitude towards using technological innovation applications and the realization of the importance of their use and accept it in the educational process.

The results support that the teacher's professional identity enhances his confrontation with the challenges that prevent using technological innovations such as social networks, digital platforms, and artificial intelligence when teaching new content (Minea-Pic, 2020), and adopting new roles in teaching such as using technological innovations in teaching (Murray, 2020; Sach, 2016), and responding flexibly towards changes of the learning environment (Sachs, 2016), including the response to the integration of technological innovations in education, and the improvement of its technical performance as important parts of its professional identity (Zhang et al., 2021; Day et al., 2005).

This result confirms what was indicated by Tschannen-Moran & Woolfolk-Hoy (2001) that the teacher's ability to use technological innovations is an important aspect of his professional development in order to change and develop the teaching and learning processes and that it expresses cognitive readiness, skill and positive attitude towards using them in teaching (Hammond et al., 2014), and gives him access to interactive and multimedia materials on the Internet (Korenova, 2016).

Therefore, the teacher's possession of professional competence plays a role in using technological innovations and enhancing his attitudes towards using them in teaching, directing his behavior towards integrating these innovations into the educational process and benefiting from them in improving educational outcomes (Cardullo et al., 2021; Skaalvik & Skaalvik, 2010).

Second: The Effects of Professional Identity on the Professional Self-Efficacy of Teachers in the Kingdom of Saudi Arabia (H2)

The results in Table 2 are supported by the view of Zhang, et al. (2021); Kelley et al. (2020) that the profession and professional identity are related to the individual's self-esteem, make life meaningful to him, and help him grow and reach self-realization; It is also supported by the view of Bernales-Turpo et al. (2022); Ballout (2009) that professional self-efficacy enhances the teacher's abilities and desires; and help him to succeed in his profession and performance and improve his skills in teaching and help him to grow

professionally and build a professional identity.

The results indicate that the professional identity plays an important role in the teacher's life, forms his psychological structure, leads to a sense of job satisfaction, and enhances his professional competence and his beliefs about his ability to perform teaching behavior (Pecháčková et al., 2014). The results also indicate that professional identity is a variable that enhances the teacher's confidence in his ability to perform teaching behavior (Abednia, 2012), make professional decisions (Hackett & Betz, 1981), and enhance motivational processes related to self-efficacy (Sawatsky et al., 2020).

The results also confirm that the teacher's professional identity enhances the ability to play a fundamental role in the quality of teaching and professional development, build a successful long-term career in the teaching profession (Veisson & Kabaday, 2018), and enhance the dimensions of his professional self-efficacy, represented in continuous interaction with the teaching context positively and managing social relations (Beijaard et al., 2004), managing professional stress and solving problems (Yazdani & Ghasedi, 2021), perseverance (Titu, 2019), job satisfaction and professional optimism (Moore and Hofman, 1988).

These results support that professional identity has a significant impact on the perceived value of the profession and the teacher's confidence in defending his professional opinions and professional competence (Turner & Knight, 2015), influence his confidence in solidifying professional knowledge, skills, and values (Sundberg et al., 2017), develop his self-efficacy beliefs (Pillen et al., 2013), develops a strong professional identity that allows him to respond and change flexibly (Sachs, 2016).), and enhance his self-efficacy and confidence in his abilities to do his work (Zhang et al., 2021; Day et al., 2005).

Third: The Effects of Professional Self-Efficacy on the Attitude towards Using Technology among Teachers in the Kingdom of Saudi Arabia (H3)

The results in Table 2 indicate that professional self-efficacy enhances the emotional aspect of the teaching and learning process (Shaukat and Iqbal, 2012), predicts the attitude towards using technological innovations in education (Tolba & Youssef, 2021; Cardullo et al., 2021; Skaalvik & Skaalvik, 2010; Tschannen- Moran and Woolfolk-Hoy, 2001), and supports what the researchers indicated that self-efficacy has an impact on teachers' attitudes towards using and integrating of technological innovations in education (Tolba & Youssef, 2022; Özyıldırım Gümüş et al., 2021; Tsai et al., 2010), and that it affects his perceptions of the interaction of technological innovations with learning materials, and enhances his efficiency in using technology while teaching (Cardullo et al., 2021; Skaalvik & Skaalvik, 2010; Tschannen-Moran and Woolfolk-Hoy, 2001). It also affects the teacher's emotional aspects in the teaching situation, such as the orientation towards using technological innovations in education, and determines the effort that he will do in teaching. This is when integrating technological innovations into education, and his insistence on facing the challenges and difficulties of the teaching situation associated with these technological innovations (Nikoçeviq-Kurti, 2022; Tolba & Youssef, 2021; Bandura, 1977).

The results also support the weak attitudes towards using technological innovations, the lack of complete conviction in the feasibility of the immediate application of technology in education, and the negative attitudes towards technology due to the lack of self-efficacy towards its full integration into the curricula (Hew & Brush, 2007; Al-Asmari, 2005). It also confirms that the positive attitudes towards using modern technologies and the adoption of high levels of their use and application in teaching and learning are affected by learning beliefs, self-efficacy, and self-confidence. (Tolba & Youssef, 2022; Papadakis et al., 2021; Vanessa et al., 2018; Silva, 2018; Mai, 2015; Sarah et al., 2015).

These results also confirm that the teacher's professional self-efficacy plays a role in determining his behavior towards technology (Papa, 2010), and the teacher needs to have a high degree of professional self-efficacy because learning how to integrate technology into the educational process requires self-confidence and self-efficacy (Banoglu et al., 2015). They also confirm that the teacher's beliefs about integrating technological innovations into the educational process and knowing how to properly use them are related to his self-efficacy (Teo et al. 2008), and indicate that professional self-efficacy enhances the stability of the teacher, when facing technological challenges and strengthens his motivation to perform

some behaviors in teaching, such as using digital educational materials (Glackin & Hohenstein, 2018).

Fourth: The mediating role of professional self-efficacy between professional identity and the attitude towards using technological innovations among teachers in the Kingdom of Saudi Arabia (H4)

The results in Table 2 and Figure 5 indicate that professional self-efficacy is an important variable for predicting the teacher's behavior in the teaching situation and determines the effort he will do in teaching, and his insistence on facing professional challenges and difficulties as an indicator of professional identity (Nikoçeviq-Kurti, 2022), which enhances the teacher's motivation and attitudes towards using technological innovations.

This result indicates that professional identity is related to the individual's self-esteem, and it makes life meaningful, helping him to grow and reach his professional self (Zhang, et al., 2021; Kelley et al., 2020); It enhances his sense of satisfaction and makes him more integrated into the workplace, succeeds in his profession and performance and improves his skills in teaching. Bernales-Turpo et al. (2022); Ballout (2009) indicate that professional self-efficacy is a powerful factor that has a direct impact on job performance, the workplace, and provides the teacher with capabilities and experiences to improve his performance, and then generates positive attitudes towards using technological innovations in education. This is also indicated by Tolba & Youssef (2021); George et al. (2018) that teachers' high self-efficacy influences their professional behaviors; such as the attitude towards using and integrating technology in education. Professional identity is largely related to self-efficacy and it is a necessary factor in a teacher's professional development (Guo et al., 2017).

It is an indicator of the teacher's confidence in his ability to perform professional behavior, forms positive values and attitudes towards work, and adopts positive attitudes about teaching "for example building positive attitudes towards using technological innovations in education" (Hackett & Betz, 1981), helping him to be more persistent to achieve learning goals when he faces challenges and is more willing to take risks in the classroom "Such as those that result from integrating technological innovations into education" (Sarfo et al., 2015), and having greater job satisfaction (Granziera and Perera, 2019), which in turn influences the attitude towards accepting the technological innovations (Tolba & Youssef, 2022).

These results also indicate that professional identity enhances teacher's professional self-efficacy, plays a major role in developing professional practice, enhances personal traits "such as openness to technological innovations" (Gori et al. 2021), improves student learning by integrating technological innovations into teaching (Hajovsky et al., 2020; Kelley et al., 2020), realizes the challenge "such as realizing the difficulties that prevent integrating technological innovations in education", and professional involvement "the attitude towards the importance of using technological innovations in the educational process" (Ventura et al., 2015), enhances self-confidence in facing great challenges and overcoming professional difficulties, "that is, the attitude towards accepting technological innovations in education despite the difficulties that prevent it" (Xiong et al., 2020), and therefore self-efficacy was included as a potential factor affected by professional identity (Chen et al., 2020), which in turn affects the attitude towards using technological innovations in education.

5. Synopsis of the Main Research Outcomes

The study found that there is an effect of the potential relationships between professional self-efficacy, professional identity, and attitudes towards using technological innovations in teaching. It also found the mediating role of professional self-efficacy in building professional identity and attitudes towards using technological innovations in teaching.

6. Conclusions

The findings from this study have contributed to the literature through The Role of Professional Self-efficacy as a Mediating Variable between Professional Identity and the Attitude Towards Using Technological Innovations among Teachers. Furthermore, The results demonstrated that professional

identity enhances the teacher's professional self-efficacy, that it plays a major role in developing professional practice, and enhances personal traits "such as openness to technological innovations".

Technological innovations play an important role in the field of education, as they prepare the learner for the labor market by increasing motivation, enhancing self-learning and higher-order thinking skills, developing the ability to discover phenomena, deeply understanding them, and focusing on the problem. In addition to improving the quality of teaching and employing teaching strategies more effectively.

The positive attitudes of teachers towards the use of technological innovations in teaching play an effective role in adapting to real life and building academic and professional compatibility. It also has positive effects on teacher qualification and occupational aspiration.

Teachers' professional identity is associated with the ability to deal with increasingly complex problems in complex educational environments, expresses understanding of learning-related situations, influences teacher behavior and use of teaching strategies and models, determines interpretations of learners' behavior, and is associated with effective teaching.

The teacher's professional self-efficacy is one of the cognitive factors that affect the development of his interest and his own goals. It is a predictive variable of professional identity, behavior and professional decision-making.

7. Limitations, Implications, and Further Directions of Research

One limitation of this research is the sample size; the sample size should have been increased so that the results could be generalized to the larger population, and so that the research would have greater statistical power. Also, a set of teacher-related variables such as gender, teaching experiences, programs and training courses should be taken into account as factors that could affect the relationships between professional identity, professional self-efficacy and attitudes towards the use of technological innovations among teachers.

The research recommends the need to train teachers to use technological innovations in education, enhance their professional self-efficacy and professional identity because it plays an effective role in the attitude towards accepting technological innovations, and reconsider professional preparation programs for teachers so that they support education attitude towards using technology in education and the need for educational institutions to enhance the dimensions of teachers' professional identity, and to hold training courses that enhance teacher's professional identity and professional self-efficacy in addition to enhance the emotional aspects related to the teaching profession such as accepting the integration of technological innovations in education, employing the variables of professional identity and professional self-efficacy in the selection of educational supervisors, supporting the teacher's positive attitudes towards using technological innovations in education to develop students' thinking through conducting training courses for teachers that enhance professional knowledge, skill, roles, attitudes, and communication, self-organization, professional motivation, and professional optimism.

The study also recommends the necessity of conducting more studies on the factors that increase the ability to predict the effectiveness of the teacher in using technological innovations in education, investigating the impact of a counseling program to increase teachers' awareness towards using technological innovations in education and to enhance the technological self-efficacy, and to develop a proposal for using technological innovations to develop teacher's professional growth, investigating the potential relationships between professional identity and other variables such as psychological satisfaction, self-management, professional commitment, and orientation towards technological acceptance, and investigating the effectiveness of a training courses and programmes based on professional self-efficacy in enhancing professional growth and awareness of the importance of using technological innovations in education.

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