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Crafting and Validating the Essence of Professional Identity in Higher Secondary Educators

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ABSTRACT

This study addresses the critical need for a quantitative instrument to measure the professional identity of teachers in higher secondary schools. While existing research has explored professional identity, a gap exists in the lack of a valid and reliable multidimensional tool. The Teacher's Professional Identity Scale (TPIS) is introduced as an innovative instrument, drawing on insights from various studies and uniquely integrating elements of social responsibility. The study emphasizes the significance of teachers as nation-builders and includes an assessment of their pro-environmental behaviors. The research employed a four-stage scale development process to create the TPIS. The initial phase involved the creation of an item pool, followed by expert opinion validation to ensure content validity. Subsequently, EFA and CFA were conducted to assess the scale's construct validity. The sample comprised 525 teachers. The scale comprises five factors, contributing to a total variance of 61.02%. CFA results demonstrated a strong fit with various indexes. This study underscores the pivotal role of professional identity as a determinant of teacher success, with broad implications for student well-being. The TPIS not only enhances our understanding of professional identity in the Indian context but also presents a promising instrument for cross-cultural assessments of teachers' professional identities.

Keywords: Teacher's Professional Identity Scale (TPIS), Higher Secondary Schools, Teacher Success, Student Well-being, Scale Development Process

Introduction

Numerous studies have focused on the crucial subject of teacher professional identity, but only a limited amount of research has sought to comprehensively understand teachers' professional identity using a quantitative tool for measurement (Olsen, 2008; Beijaard, Meijer, & Verloop, 2004; Beauchamp & Thomas 2009). The majority of these investigations have taken a qualitative approach. The effectiveness of teachers is directly impacted by their professional identity, influencing their pedagogical choices, instructional decisions, and classroom management techniques. When teachers possess a strong sense of professional identity, they are more likely to be reflective practitioners, constantly seeking ways to enhance their work and address the diverse needs of their students. A person's professional identity undergoes continuous evolution throughout their life, providing educators with a sense of continuity with the past, significance in the present, and direction for the future (Beijaard, Meijer, & Verloop, 2004; Levine & Cote, 2014). Societal, cultural, and experiential factors can shape one's professional identity (Holland & Uys, 2012).

Ethical responsibility towards students, colleagues, and the broader community is a fundamental aspect of professional identity. Teachers prioritize the well-being and development of their students, basing their decisions on moral principles.

The process of teachers creating or understanding their current professional identities inevitably involves questions such as "How do I see my position as a teacher?" and "Who am I right now?" (Cheung, 2008). Teachers' conceptions or self-images are intricately linked to their professional identities (Alsup, 2003; Abu-

Alruz & Khasawneh, 2013).While some argue that teachers' identities should conform to socially accepted norms of knowledge and skills, teachers themselves emphasize the importance of integrating their experiences and backgrounds with their professional roles (Holland et al., 2006). In a broader sense, identity is the interplay between the meanings individuals attribute to themselves and the meanings others ascribe to them through social behaviour (Cheung, 2008).

Building on these foundations, Social Identity Theory (Tajfel & Turner, 2004) shed light on the establishment of professional identity in education, arguing that people identify themselves and others based on shared qualities within social groups. In the context of teaching, researchers want to understand how teachers define themselves within the educational community and the significant impact that this categorization has on their professional identities. Furthermore, Self-Determination Theory (SDT) adds another layer of insight by focusing on the intrinsic needs for autonomy, competence, and relatedness (Deci & Ryan, 2012). The study will focus on how teachers see their professional autonomy and competence and how their relationship with the larger educational community shapes their professional identity. Identity Theory (Stryker & Burke, 2000) helps in understanding how the responsibilities and societal expectations associated with teaching interact to shape teachers' professional identities. We seek a harmonic combination of the two by separating out the complexity that teachers experience as they manage the interaction between personal identity and professional duty.

Cognitive Dissonance Theory by Leon Festinger (1957) provides a framework for understanding teachers can also experience cognitive dissonance regarding their professional identity (as cited in Harmon-Jonesb & Mills, 2019). The present study looks at how they deal with competing expectations and adjust to problems in the constantly shifting educational setting. Another theory, Psychosocial Development by Erikson (1959), serves as an outline, allowing researchers to study the dynamic evolution of a teacher's professional identity at various periods of their career. By exploring the challenges and developmental tasks connected with each stage, researchers attempt to shed light on the complex relationship between personal growth and professional identity formation.

This study aims to bridge the gap between qualitative and quantitative approaches by combining these psychological fundamental theories with a holistic and enriched perspective on the multifaceted nature of this essential component for the field of education. Establishing a professional identity is crucial for becoming a successful teacher (Olsen, 2017). Teachers must cultivate a sense of professional identity to integrate their subjectivities with the professional and cultural expectations associated with the teaching profession (Alsup, 2006). Past studies have revealed lack of a valid and reliable multidimensional instrument. Consequently, the current research is focused on developing a quantitative instrument with multiple dimensions that can effectively measure the essential components of teachers' professional identities.

Aim of the present study

The aim of this research is to create a reliable and valid tool to assess the professional identity of teachers in Indian higher secondary schools. Furthermore, it is anticipated that the 'teacher's professional identity scale' developed in this study could prove useful in evaluating the professional identities of teachers in various countries and cultures, not just limited to Indian context. The significance of teacher professional identity is underscored by its connection to multiple facets of education, and the introduction of a quantitative instrument contributes to a better understanding of this phenomenon.

Upon thorough examination and comprehension of the Professional Identity concept in various studies, it becomes evident that professional identity extends beyond specific responsibilities such as professional growth, work-life balance, and commitment. It encompasses social responsibility, an aspect often overlooked by many scales. This study addresses this gap by incorporating crucial elements into the professional identity of teachers, specifically focusing on "teachers as nation builders" and 'teachers' pro-environmental behaviors', acknowledging that these elements are integral to a complete understanding of teachers' professional identity.

Methods

The construction of the "TPIS" involved employing fundamental research methods to gauge the professional identity of teachers in higher secondary schools. The primary aim of this research was to generate valuable items that contribute to the understanding and definition of professional identity.

To ensure the robustness of the TPIS, it is recommended that a minimum of 295 teachers be included in the study, given that the calculation for sample size is based on 59 items. In other words, a ratio of five teachers for every item is suggested. To maintain the integrity of the scale, 31 teachers were excluded due to incomplete statements. The overall sample size comprised 525 teachers, and Table 1 provides detailed information about the subjects constituting the sample subgroup.

Table 1 Descriptive Statistics Related to the Teacher's Professional Identity Scale

Analysis	n
EFA	315
CFA	210
Total	525

n denotes the number of participants

Data Analysis

Two sampling groups, consisting of 525 teachers from 46 distinct secondary schools, were formed to participate in the study's sample for the exploratory factor analysis (EFA) and the Confirmatory Factor Analysis (CFA). The sample did not include the number of teachers who left the form unfilled/half-filled. The data was examined for normal distribution (df=525=.718) using the Shapiro-Wilks and Kolmogorov-Smirnov tests. EFA and CFA were used throughout the development of the TPIS to assess the validity of the instrument.

Confirmatory factor analysis tests were conducted using the Amos 27 package programme, whereas exploratory factor analysis were conducted using the IBM-SPSS 28.0 package programme. Additionally, the reliability of the item-test score correlations was determined using the Cronbach Alpha internal consistency coefficient. PATH analysis, confirmatory factor analysis, and structural equation modelling, Convergent and Divergent validity were all developed.

Results

Item Pool Stage

During the initial phase of developing the scale, relevant literature was thoroughly reviewed. Articles and theses within the field were scrutinized to construct the scale for teachers' professional identity. The prevalent terms and phrases in each article's definitions were documented. Subsequently, through focus group interviews involving teachers, parents, and students, the frequently used words and sentences were transformed into question items, resulting in the creation of an item pool. Questions were formulated and submitted to an expert for evaluation. Additionally, experts were enlisted to assess the suitability of the items. A total of 108 item pools were identified through this process.

Expert opinion stage

Twelve educators and nine researchers received prepared expert forms, and their input was asked for on these kinds of questions. The formats for expert comments on the statements was provided, and were told to indicate in the corresponding columns whether they approved or disapproved each item by rating it on a four-point scale as highly relevant, relevant, slightly relevant, or not relevant. The items that have been classified as negative are denoted by a star (*). The experts recommended eliminating similar items and clarifying unclear sentences. The initial version of the scale included 108 items and narrowed down to 59 after the expert opinions. Following the analysis of the expert opinions using scores determined content validity ratio were analysed with the formula.

$CVR= (N_e - N/2) / (N/2)$

Items with values less than 0.7 as well as those that were identical, irrelevant, and difficult to articulate or understand were eliminated. Consequently, a test questionnaire with 59 elements was created. As analyses were conducted on this trial questionnaire, items were formatted as rating scales.

Factor Analysis Stage

Exploratory Factor Analysis

Upon administering the initial questionnaire of the scale to a subset of 315 teachers (representing the first half of the total sample), the collected data underwent processing using the SPSS program. Before analysis, items requiring reversed coding were transformed into new values. The analytical phase commenced with an exploratory factor analysis, followed by an Oblique rotation process. To evaluate the suitability of the data for factor analysis, the Kaiser-Meyer-Olkin test and Bartlett's sphericity test were employed. The data, consisting of 59 items, achieved high scores for these tests, with a Kaiser-Meyer-Olkin Coefficient (KMO) of 0.917 and a Bartlett's sphericity test result of .000, indicating favourable conditions for factor analysis.

The exploratory factor analysis began, guided by the criterion that factor loadings should exceed .30. Items with loadings below .10, in accordance with Büyüköztürk's (2011) guidance, were excluded from the scale (as cited in Abu-Alruz, J., & Khasawneh, S. (2013). Unrotated factor solution of the factor loadings revealed 11 factors with Eigenvalues greater than one and their corresponding variances. To assess reliability for both the overall scale and each factor, the Cronbach's Alpha coefficient was computed.

Following the exploratory factor analysis, the study presents the outcomes, including reliability, item-total test correlation, and the results of factor analysis, detailed in Table 2 for comprehensive examination.

Table 2 The Results of Reliability and Factor Analysis of the Teacher's Professional Identity Scale

Factors	Eigenvalue	Variance	Cronbach's Alpha
1	14.395	24.398	
2	7.459	12.642	
3	5.266	8.925	
4	3.003	5.090	
5	2.364	4.006	
6	2.065	3.500	0.862
7	1.850	3.135	
8	1.495	2.534	
9	1.318	2.233	
10	1.061	1.798	
11	1.012	1.716	

Upon examining Table 2, it is evident that the internal consistency coefficient of the test questionnaire is 0.862, leading to the identification of eleven factors, each possessing an Eigenvalue exceeding 1. A detailed analysis of the Eigenvalues highlights the substantial nature of the first factor, boasting an Eigenvalue of 14.395, which is twice as significant as the second factor with an Eigenvalue of 7.459. This implies that the first factor makes a substantial contribution, accounting for 24.398% of the total variance, while the second factor contributes 12.642% to the variance. The third factor, with a variance of 5.266, corresponds to 8.925% of the total variance. Notably, factors seven through eleven exhibits closely aligned loadings. Figure 1, illustrating the Eigenvalues through ScreePlot analysis, further clarifies these observations.

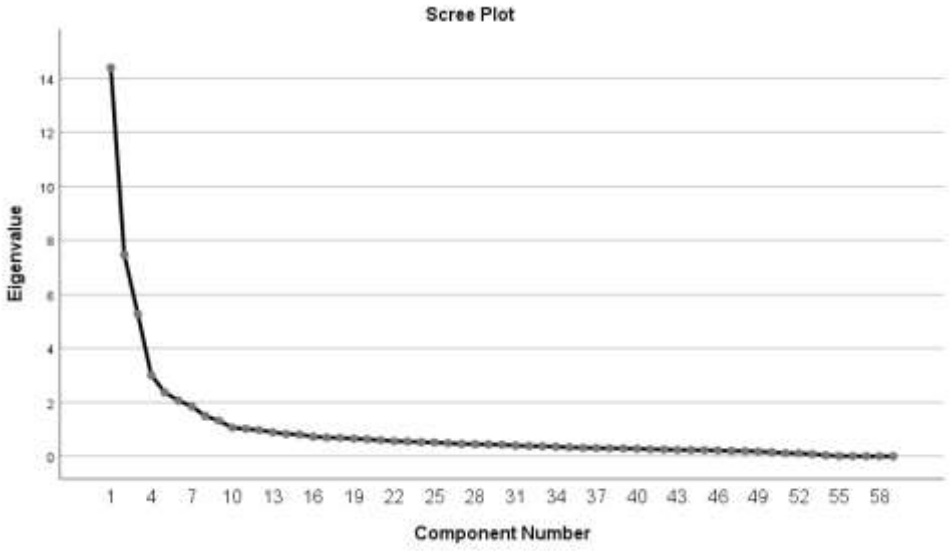


Fig. 1 Factor Eigenvalues of Scale Plot

As depicted in Figure 1, the Eigenvalues for all eleven factors exceed the threshold of 1. After determining the number of factors, it is essential to scrutinize the distribution of these factors. Data were extracted using the Principle Component Method with Oblique rotation technique. It is a basic understanding in factor analysis that factor loading value of 0.30 is accepted as a minimum value to be considered as significant (Kothari, 2004). After systematically removing items with factor loading below 0.30 and cross-loadings, 5-factor solution with 39 items (Table 3) was delineated through EFA. These five factors explained 61.01% of the variance of Teacher's Professional Identity. A comprehensive presentation of details, including factor values, and reliability coefficients, is provided in Table 3 for a comprehensive understanding.

Table 3 The Results of Reliability and Factor Analysis for 5 factors of the Teacher's Professional Identity Scale

Factors	Eigenvalue	Variance	Cronbach's Alpha
1	13.594	32.366	0.90
2	5.198	12.376	0.91
3	2.856	6.799	0.94
4	2.201	5.242	0.90
5	1.778	4.234	0.89
	Total	61.017	0.84

F.1 Role concept as Teacher; *F.2* Professional growth; *F.3* Relationship with students and colleagues; *F.4* Teacher as Nation Builder; *F.5* Pro-environmental behavior

Based on the outcomes in Table 3, twenty items out of the original 59 were deemed unsuitable following the oblique rotation. Consequently, these 20 items were excluded from the scale, resulting in a refined structure comprising 5 factors, each possessing an Eigenvalue exceeding 1. This reconfigured structure demonstrated a variance of 61.017%, with each factor contributing distinctly: Factor 1 accounting for 32.366%, Factor 2 for 12.376%, Factor 3 for 6.799%, Factor 4 for 5.242%, and Factor 5 for 4.234% of the total variance. The internal reliability coefficients for each factor were calculated as 0.90, 0.91, 0.94, 0.90, and 0.89, respectively. Moreover, the overall reliability coefficient, measured through Cronbach's Alpha, was established at 0.84, aligning with the criteria emphasized by Sipahi,Yurtkoru & Çinko (2010) and Büyüköztürk (2011), and others for satisfactory reliability (as mentioned in Akın & Özcan, 2015; Abu-Alruz & Khasawneh, 2013).
Of the remaining 39 items, their distribution across the factors revealed eight items for Factor 1, six items for Factor 2, nine items for Factor 3, nine items for Factor 4, and seven items for Factor 5. The components exhibited a generally positive and significant correlation with each other and the total score, supporting the conclusion that the scale maintains a single-factor, 5-component structure. Following the removal process, the scale retained 39 items.

Confirmatory Factor Analysis

Çapık, 2014 suggested that the core principle of structural equilibrium modeling hinges on its exclusive dependence on theory (as cited in Yanmış et al., 2022). In contrast to exploratory factor analysis, which can be performed without a theoretical basis, confirmatory analysis requires the existence of a theory. Confirmatory factor analysis is employed as a method in constructing measurement models, as described by Myers (2000) defines it as the procedure of revealing latent variables within a pre-established model (as cited in İNCEBACAK and Ersoy (2021).
To evaluate the validity of the 5-factor model derived from exploratory factor analysis, CFA was utilized. Compliance indices such as RMSEA, GFI, CFI, AGFI, NFI, and Chi-square fit tests were examined to determine the model's precision. The results of these analyses are detailed in Table 4:

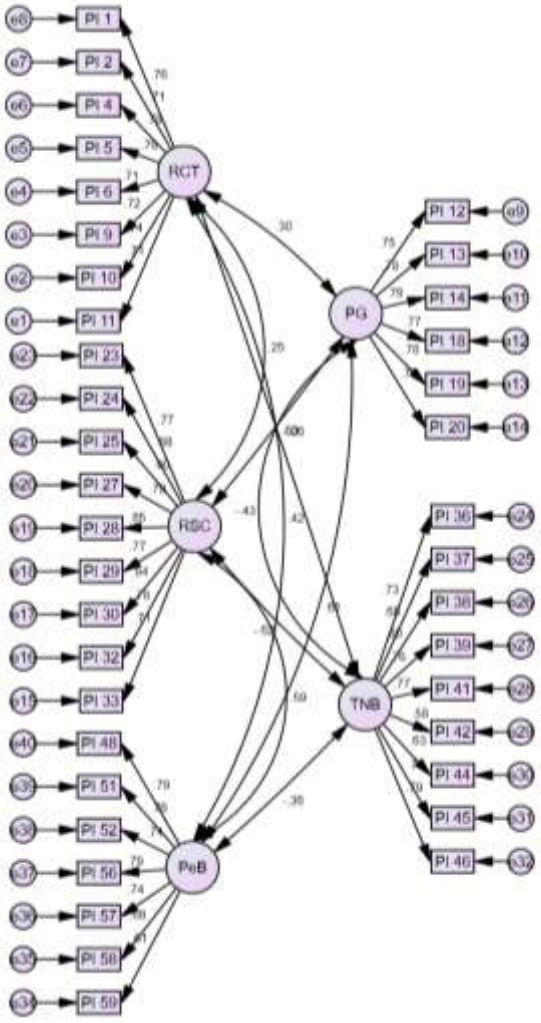
Table 4 Results of the Confirmatory Factor Analysis

Above	Perfect Above	Acceptable Above	Model Value
RMSEA	0 < RMSEA <0.05	0.05< RMSEA <0.10	.058
NFI	0.95 ≤ NFI ≤ 1	0.90 ≤ NFI ≤ 0.95	.850
CFI	0.97 ≤ CFI ≤ 1	0.97 ≤ CFI ≤ 1	.907
GFI	0.95 ≤ GFI ≤ 1	0.90 ≤ GFI ≤ 0.95	.934
χ2/df	1 < χ2/df < 2	2 < χ2/df < 3	2.394
SRMR	0.05 ≤ SRMR ≤ 1	0.00 ≤ SRMR ≤ 0.05	.0540
P	0.05 ≤ p ≤ 1	0.05 ≤ p ≤ 0.05	.039
AGFI	0.95 ≤ AGFI ≤ 1	0.90 ≤ AGFI ≤ 0.95	.910

The results of the model fit indices provide valuable insights into the adequacy of the proposed measurement model. Firstly, the Root Mean Square Error of Approximation (RMSEA) value of 0.058 suggests a relatively good fit of the model to the data. Although slightly higher than the conventional threshold of 0.05, this value indicates acceptable model fit. The Normed Fit Index (NFI) value of 0.850 indicates that the proposed model captures a substantial amount of variance in the observed variables. While falling slightly below the recommended threshold of 0.90, this value suggests a reasonable fit of the model to the data.
Similarly, the Comparative Fit Index (CFI) value of 0.907 also provides evidence of adequate model fit, although it falls slightly below the commonly accepted threshold of 0.95. Nevertheless, this value indicates a satisfactory level of fit between the proposed model and the observed data. The Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI) values of 0.934 and 0.910, respectively, exceed the recommended threshold of 0.90. These values further support the notion that the proposed model provides a good representation of the underlying data. The χ^2/df ratio of 2.394, while slightly higher than the ideal value of 2.0, still falls within an acceptable range. This ratio indicates a reasonable balance between the chi-square statistic and the degrees of freedom, suggesting that the proposed model adequately explains the observed covariance among the variables.
The Standardized Root Mean Square Residual (SRMR) value of 0.0540 is below the commonly accepted threshold of 0.08, indicating a good fit of the model to the data with minimal residual covariance.
Finally, the statistically significant p-value of 0.039 associated with the chi-square statistic provides further evidence supporting the adequacy of the proposed model in explaining the observed data. Overall, the results of the CFA suggest that the proposed scale measuring teachers' professional identity demonstrates acceptable levels of reliability and validity. However, further refinement and validation of the scale may be warranted to ensure its strength across different contexts and populations.

PATH Diagram

The path diagram is a schematic representation produced by analysing the structural equilibrium model. This diagram includes t values, factor loadings, variances, and goodness-of-fit values. Details not covered in this analysis can be accessed within the Amos program. The path diagram illustrating the suggested structural model is shown below.



The path diagram for the proposed structural model corresponds to the conducted analyses, confirming the accurate loading of items onto their designated factors. This observation signifies that the analyses are consistent with the established model.

Table 5 Convergent and Divergent validity of TPIS

Convergent validity	Divergent validity
PIQ	BEIS
.42**	-.28**

Note: **p < 0.01; PIQ – Professional Identity Questionnaire; BEIS – Brief Emotional Intelligence Scale

To establish the convergent and divergent validity of TPIS, Karl Pearson correlation was used. The associations between TPIS scores and the theoretically related scales namely, Professional Identity Questionnaire (Abu-Alruz & Khasawneh, 2013) and Brief Emotional Intelligence Scale, BEIS-10 (Davies et al., 2010) were calculated. Results from table 3.4 showed that TPIS had a significant positive association with Professional Identity Questionnaire and whereas significant negative association with Brief Emotional Intelligence Scale and demonstrated high convergent and divergent validity.

Discussion

Findings of this study affirm the adequacy of the TPIS, as evidenced by its robust validity and reliability. The scale is divided into five distinctive sub-factors - namely, "Role concept as Teacher", "Professional growth",

"Relationship with students and colleagues", "Teacher as Nation Builder" and "Pro-environmental behavior" - further enhances its precision in capturing the nuanced dimensions of professional identity among higher secondary school teachers.

The internal reliability coefficients for each of these sub-factors were found to be commendably high, with values of 0.90, 0.91, 0.94, 0.90, and 0.89, respectively. These coefficients underscore the internal consistency and stability of the TPI scale, reinforcing its effectiveness in measuring specific facets of professional identity with a high degree of accuracy. Additionally, the overall reliability coefficient, as measured by Cronbach's Alpha, was determined to be 0.84, further attesting to the scale's reliability and internal coherence.

The results of the present study contribute significantly to the nascent field of professional identity research, specifically within the context of higher secondary education. The findings highlight a crucial gap in the existing literature, as prior research has predominantly cantered around the professional identity of pre-service teachers and faculty members in higher education institutions. The omission of a dedicated exploration into the professional identity of higher secondary teachers is a noteworthy limitation that this study addresses. The distinct nature of the higher secondary education environment warrants unique attention, given its specialized focus on preparing students for tertiary education or vocational pursuits.

This research serves as a crucial step towards the development of a validated instrument tailored to the unique characteristics and challenges faced by higher secondary teachers globally, and specifically in the context of India.

Conclusion

In conclusion, the study demonstrated the successful development of an instrument, the TPIS, designed to precisely measure the multifaceted constructs of professional identity within the higher secondary education setting. The thorough analysis of collected data affirms the methodological soundness of the scale, ensuring its compatibility with the model and its applicability for evaluating the professional identity of teachers in higher secondary schools. The critical motivation behind creating the TPIS lies in recognizing the pivotal role of professional identity as a key determinant of teacher success, with far-reaching implications for the well-being and academic achievement of students.

Ultimately, this research serves as a foundational step towards the development of higher secondary schools, both locally and globally. By delving into the intricate dimensions of professional identity, this study lays the groundwork for interventions that enhances the educational experience for both teachers and students. In the dynamic and competitive global landscape, teachers are recognized as the linchpin for institutional survival and success, making the cultivation of their professional identity a paramount concern for the advancement of higher secondary education.

Ethical approval

We declare that the study was conducted in compliance with the ethical principles outlined in the 1964 Declarations of Helsinki and subsequent amendments.

Consent to participate

Each individual participant in the study gave their informed consent.

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