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Professional Identity Coherence and Burnout Resistance Among STEM Teachers

HIYLE B. PINEDA, LPT.[1], RONNIELHEN R. PASCUA, LPT.[2], ROEL BUTCH ANG, PHD.[3]
[1, 2, 3]*Nueva Ecija University of Science and Technology, Graduate School, Sumacub Campus, Cabanatuan City, Nueva Ecija, Philippines*

Abstract- ***This study investigated the relationship between professional identity coherence and burnout resistance among STEM teachers. A quantitative correlational research design was employed, utilizing survey questionnaires distributed to 103 secondary STEM teachers. Data analysis involved using descriptive statistics, Pearson correlation, and ANOVA. Professional identity coherence was reported as very high, particularly in the areas of teacher leadership, teaching efficacy, and teaching outcome, while career awareness was rated as high. Burnout resistance was also very high, with professional and social dimensions rated very high, and emotional and motivational dimensions rated high. The results indicated a moderate positive relationship between professional identity coherence and burnout resistance, suggesting that teachers with stronger professional identity tend to exhibit greater resilience. The study concludes that a strong professional identity is associated with greater burnout resistance among STEM teachers. Prioritizing professional identity development and resilience-building initiatives, particularly for early-career teachers, may enhance teacher well-being and effectiveness.***

Index Terms- ***Professional Identity Coherence, Burnout Resistance, Teacher Resilience, STEM Teachers, Quantitative Correlational Study***

I. INTRODUCTION

Education plays a significant role in national development by fostering scientific literacy, innovation, and technological advancement. This objective aligns with the United Nations' Sustainable Development Goal 4 (SDG) for Quality Education, which seeks to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Within this context, Science, Technology, Engineering, and Mathematics (STEM) education and literacy have become priorities in academic studies, as they provide learners the essential skills needed in the 21st-century workforce [15]. Teachers as key agents of educational delivery, are expected to address the increasing demands for curriculum reform, digital transformation, and diverse learner needs. These expectations often place significant pressure on teachers, making teaching a highly demanding profession [25].

Teacher well-being has become an increasingly significant concern in recent years, particularly with respect to burnout. Burnout is widely recognized as a psychological condition marked by emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment [16]. [18] states that teacher burnout negatively affects both the teacher and the learning environment, leading to reduced job satisfaction, lower teaching effectiveness, and increased attrition rates. This concern also aligns with the United Nations SDG 3 for Good Health and Well-Being, which emphasizes the importance of promoting mental health and well-being across all professions.

The concept of professional identity has emerged as a significant focus in educational research in response to contemporary challenges. Identity is defined as an individual's constructed sense of self and self-awareness, shaped by their understanding of personal roles within a socio-cultural context [14]. A coherent professional identity, characterized by stability, integration, and alignment with both personal and professional aspirations, enables teachers to develop their own perspectives on their conduct, actions, and interpretation of their work and societal roles [17]. [24] indicate that teachers with a coherent professional identity demonstrate greater confidence, resilience, and adaptability in responding to the evolving demands of education.

The study aimed to examine the relationship between professional identity coherence and burnout resistance among STEM teachers. It specifically examined

whether a clear and stable professional identity enhances teachers' capacity to resist burnout and to identify factors that may strengthen this relationship. The findings were intended to provide valuable insights for educators, school administrators, and policymakers in creating supportive environments that promote both teacher effectiveness and well-being.

II. RELATED STUDIES

Professional identity is widely recognized as essential for understanding teachers' motivation, effectiveness, and well-being. It reflects how teachers view themselves in their professional roles, shaped by their beliefs, values, experiences, and social interactions. [27] described professional identity as a multidimensional construct that includes emotional commitment, self-efficacy, and a sense of belonging to the profession. [27] shows that professional identity reduces burnout and strengthens resilience among teachers. This study highlights the mediating roles of psychological capital, work engagement, and resilience.

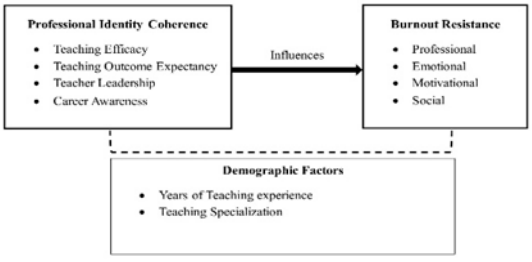
[25] defines academic burnout as a maladaptive syndrome resulting from academic demands and expectations characterized by emotional exhaustion such as anxiety, frustration, and apathy, cynicism such as lack of enthusiasm and engagement in learning, and low personal accomplishment and academic efficacy including a diminished sense of self-worth.

In the Philippines, burnout is associated with excessive workloads, large class sizes, and administrative demands. [4] found that Filipino teachers often work long hours, manage multiple classes, and oversee large numbers of students, all of which contribute significantly to stress and burnout. Studies show that Filipino teachers often assume multiple roles beyond instruction, influencing how they develop and maintain their professional identity. [1] found that barriers to professional development, such as time constraints, workload, and financial limitations, directly affect teachers' professional growth and identity formation. [4] identified that Filipino teachers engaged in remote learning worked an average of over 12 hours per day, managed multiple classes, and taught large student populations, resulting in significant emotional exhaustion. These findings emphasize that workload and working conditions are primary contributors to burnout.

[8] reported that additional responsibilities beyond teaching caused overwhelming stress, self-doubt, and emotional exhaustion. [7] found that burnout lowers job satisfaction and is influenced by increased teaching demands and limited coping resources. Despite using various coping strategies, teachers continued to experience ongoing stress that affected their well-being. [19] observed moderate to high levels of emotional exhaustion and depersonalization among tertiary teachers during pandemic, showing that remote learning intensified burnout. Furthermore, [3] found that negative leadership practices can erode teachers' of professional self-concept, reduce motivation, and increase emotional strain. This study illustrates how contextual and organizational factors in the Philippines influence both professional identity and burnout. Studies indicate that a strong professional identity helps protect teachers from burnout. Teachers with a clear sense of purpose and commitment manage stress more effectively.

III. METHODOLOGY

The study examined the relationship between professional identity coherence, as independent variable, and burnout resistance, as dependent variable, among STEM teachers. The study also examined the demographic variables such as years of teaching experience and subject specialization as moderators to assess differences in professional identity and resilience among subgroups.



This study used quantitative correlational research design to examine the relationship between professional identity coherence and burnout resistance among STEM teachers.

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The study was conducted in selected secondary schools, particularly in Tarlac, both private and public schools offering STEM subjects. Only schools that granted permission for data collection were included to ensure ethical conduct and data validity. Respondents were current secondary-level, both Junior and Senior High School, STEM teachers selected through purposive sampling.

Professional identity coherence was measured using the Teacher Efficacy and Attitudes Toward STEM (T-STEM) Survey, developed by the Friday Institute for Educational Innovation (2012), which assesses four dimensions: teaching efficacy, teaching outcome expectancy, teacher leadership, and career awareness. Participants responded on a Likert-scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Burnout resistance was measured using the Teacher Resilience Scale, developed by Trang and Thang (2023), which evaluates professional, emotional, motivational, and social dimensions, also using a Likert-scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Both instruments have demonstrated validity and reliability in previous studies.

IV. RESULTS AND DISCUSSION

A. Level of Professional Identity Coherence

Table 1 shows the level of professional identity coherence among STEM teachers in terms of teaching efficacy, teaching outcome, teacher leadership, and STEM career awareness.

Professional Identity	Mean	Interpretation
Teaching Efficacy	4.48	Very High
Teaching Outcome	4.39	Very High
Teacher Leadership	4.59	Very High
Career Awareness	4.18	High
Total Mean	4.41	Very High

The findings indicate that STEM teachers demonstrate a very high level of professional identity ($\mu = 4.41$). This suggests that STEM teachers are committed to their professional responsibilities, confident in their teaching duties, and posses a strong sense of self as educators.

B. Level of Burnout Resistance

Table 2 shows the level of burnout resistance among STEM teachers in terms of professional, emotional, motivational, and social.

Burnout Resistance	Mean	Interpretation
Professional	4.51	Very High
Emotional	4.02	High
Motivational	4.15	High
Social	4.45	Very High
Total Mean	4.28	Very High

The findings indicate that STEM teachers demonstrate a very high level of burnout resistance ($\mu = 4.28$). This suggests that STEM teachers posses strong resilience and have the capacity to effectively manage work-related stress and challenges.

C. Relationship Between Professional Identity Coherence and Burnout Resistance Among STEM Teachers

Table 3 shows the relationship between professional identity coherence and burnout resistance among STEM teachers.

	PIC	*BR*
Professional Identity Coherence	1	
Burnout Resistance	0.635038689	1

The findings indicated a moderate positive relationship between the two variables, as evidenced by a Pearson correlation coefficient (r) of 0.635. This suggests that as teacher's professional identity coherence increases, the level of burnout resistance also tends to increase. The computed p-value of 9.71×10^{-13} ($p < 0.0001$) is far below the 0.05 level of significance. This indicates that the relationship between the variables is highly statistically significant.

D. Difference Between Professional Identity Coherence and Burnout Resistance When Grouped According to Years of Experience and Specialization

Table 4.1 shows the difference in professional identity coherence when grouped according to years of experience.

Groups	Count	Sum	Average	Variance
1-10	77	331.96	4.31	0.149
11-20	15	70.10	4.67	0.030
21-33	11	52.35	4.76	0.004

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	3.13	2	1.57	13.31	7.50781E-06	3.09
Within Groups	11.77	100	0.12			
Total	14.90	102				

This suggests that professional identity coherence tends to increase as teaching experience increases, suggesting that more experienced teachers have a more developed and stronger sense of professional identity compared to early-career teachers. The ANOVA results further revealed a statistically significant difference among the three groups, with F-value of 13.31 which is greater than the critical value of 3.09, and p-value is 7.51×10^{-6} ($p < 0.001$). Since the p-value is less than 0.05 level of significance, this means that there is a significant difference in professional identity coherence across years of teaching experience.

Table 4.2 shows the difference in burnout resistance coherence when grouped according to years of experience.

Group	Count	Sum	Ave	Variance
1-10	77	327	4.25	0.20
11-20	15	65.45	4.36	0.06
21-33	11	48.65	4.42	0.05

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.41	2	0.21	1.24	0.29	3.09
Within Groups	16.63	100	0.17			
Total	17.04	102				

This suggests that there is a minor increase in burnout resistance as teaching experience increases. However, the differences among the group means are relatively small. The ANOVA results revealed that the computed F-value is 1.24, which is lower than the critical value of 3.09, and p-value is 0.293, which is greater than 0.05 level of significance. This suggests that the differences among the groups are not statistically significant.

Table 4.3 shows the difference in professional identity coherence when grouped according to teaching specialization.

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Groups	Count	Sum	Average
MATH	50	223.13	4.46
SCIENCE	53	231.28	4.36

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.25	1	0.25	1.74	0.19	3.94
Within Groups	14.65	101	0.15			
Total	14.90	102				

This suggests that Mathematics teachers demonstrate a higher level of professional identity coherence than Science teachers. The ANOVA results revealed that the computed F-value is 1.74, which is lower than the critical value of 3.94, and p-value is 0.191 which is greater than the 0.05 level of significance. This suggests that the difference in professional identity coherence between Mathematics and Science teachers is not statistically significant.

Table 4.4 shows the difference in burnout resistance when grouped according to teaching specialization.

Groups	Count	Sum	Average	Variance
MATH	50	216	4.32	0.07
SCIENCE	53	225.1	4.25	0.26

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.14	1	0.14	0.82	0.37	3.94
Within Groups	16.90	101	0.17			
Total	17.04	102				

This suggests that Mathematics teachers demonstrate a higher level of burnout resistance compared to Science teachers. The ANOVA results revealed that the computed F-value is 0.82, which is lower than the critical value of 3.94, and p-value is 0.369, which is greater than the 0.05 level of significance. This indicates that the difference in burnout resistance between Mathematics and Science teachers is not statistically significant.

IV. CONCLUSION AND RECOMMENDATIONS

Based on the findings, the study concludes that STEM teachers possess a strong and well-established professional identity, which contributes positively to their ability to cope with stress and maintain engagement in their profession. The significant relationship between professional identity coherence and burnout resistance confirms that a clear and stable professional identity serves as an important factor in enhancing teacher resilience.

The findings also suggests that experience plays a role in strengthening professional identity, as teachers with more years of teaching experience exhibit higher levels of identity coherence. However, burnout resistance appears to be consistently cultivated across different levels of experience, indicating that resilience may be influenced by factors beyond tenure alone. Furthermore, the absence of significant differences based on teaching specialization suggests that both Science and Mathematics teachers have comparable experiences in terms of professional identity and burnout resistance.

School administrators should develop and implement programs that strengthen teachers' professional identity, including leadership development initiatives, mentoring system, and collaborative professional learning communities. These programs are particularly beneficial for early-career teachers who comprise the majority of the workforce.

Policymakers should prioritize well-being of teachers by establishing supportive policies that address workload, promote career growth opportunities, and provide mental health support.

Future researchers are encouraged to explore and investigate additional factors that may affect professional identity and burnout resistance, such as the work environment, leadership styles, and organizational support. Deeper insights into the lived experiences of teachers may also be obtained by employing qualitative or mixed-method approaches.

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