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Research Article

Teachers' Satisfaction and Perceived Stress in Science Teaching: A Mixed-Methods Study

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ABSTRACT

The COVID-19 pandemic drastically impacted the world of education, influencing teachers' levels of stress and satisfaction. While numerous studies address teacher stress and job satisfaction, there is a paucity of evidence in the context of public senior high school science teachers in science instruction during a global health crisis. This explanatory sequential mixed-methods study examined the relationship between levels of science teaching satisfaction and perceived stress, as well as the factors contributing to teachers' satisfaction and stress. The researchers utilized standardized instruments and in-depth interviews with the research participants. Results showed that science teachers had average job satisfaction and moderately perceived stress in science teaching. The levels of perceived stress and job satisfaction between education and non-teacher education graduates are comparatively similar. Meanwhile, the study found a non-significant negative relationship between science teaching satisfaction and perceived stress. Furthermore, factors such as workplace culture, student learning, good compensation with opportunities for promotion, and professional development programs were found to impact teachers' satisfaction in science teaching. Factors contributing to teachers' perceived stress included the COVID-19 pandemic, availability of teaching and learning resources, limited contact hours, demands for submission of reports and other paperwork, student behavior and attitude towards studies, and teacher-specific factors. Finally, suggestions from the science teachers to reduce stress entailed maintaining work-life balance, exercising proper time management, reduced workloads to allow for a focus on teaching, and promoting collaboration among science teachers.

Keywords: *Perceived Stress, Job Satisfaction, Science Teachers, Mixed Methods, COVID-19*

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Introduction

Teachers are the most influential individuals in our culture. They prepare children for success and inculcate in them a sense of purpose in order to become globally productive citizens. Children of today will be the leaders of tomorrow, and teachers play a crucial role in honing children for their future. The teacher's role has continued to be inspiring, calling for more than serving than employment for pay and benefits. The teaching profession remains a complex endeavor due to the evolving needs of the dynamic world. In addition to transferring skills, knowledge, attitudes, and beliefs, the role of teaching has also molded people to adapt to a world that is changing on a social, political, economic, and technological level.

COVID-19, a novel virus, was declared a global health emergency in January 2020 (AlAteeq et al., 2020). The WHO recorded 765,222,932 COVID-19 cases and 6,921,614 deaths as of May 3, 2023. In 2022, the Philippines Department of Health reported 4,092,158 cases. The Philippines has been one of Asia's hardest hit by the coronavirus's persistent and broad spread. With 4,092,158 cases, it ranks second in Southeast Asia behind Indonesia. In the Philippines, pandemic has generated unprecedented problems in education and employment (Moralista & Oducado, 2020). Educators suffered from the COVID-19 pandemic. Even before the existence of the viral infection, many Philippine schools struggled due to a lack of funding, poor infrastructure, and rising enrolments. The identified pathogen highlighted a longstanding problem in Philippine education system (Alves, 2020).

The country faced significant challenges in providing quality science and technology education to its students before the pandemic. Filipino students did poorly in science's first-ever Programme for International Student Assessment (PISA). The World Economic Forum placed the Philippines 67th out of 140 countries in 2016 and 79th out of 138 nations in 2017 for worldwide competitiveness in good scientific education (Schwab, 2019).

The pandemic transformed the way science teachers approach their instruction. The rapidly shifting school activity mechanisms and its effects on teachers' epistemological views about student involvement and evaluation in teaching science amid the pandemic were explored by McPherson and Pearce (2022). According to the study, teachers adopted new teaching philosophies and methods that mirrored the new educational landscape brought about by the pandemic. Their practices changed as they engaged students in laboratory exercises, synchronous group projects, and evaluation strategies. These shifts caused turmoil for teachers, resulting in perceptions of stress and issues with job satisfaction.

Job satisfaction is described as the subjective disposition of employees in relation to their work and work description (Toropova et al., 2020). If work demands and employment expectations are aligned, it will result in high job satisfaction. Previous research has shown that significant predictors of job satisfaction include work goals, job support, work environment, self-efficacy, and the nature of the relationship with educational managers (Cayupe et al., 2023). The sudden shift in the educational landscape during the pandemic forced teachers to continue with traditional science teaching practices, which proved ineffective in the new context. This eventually led to a decreased job satisfaction.

Teaching, albeit admirable, has a long history of dissatisfaction. Alson (2019) observed that teachers in countries like Ethiopia (Kabito & Wami, 2020) and the Philippines experience stress to varied degrees. However, a study shows that stress levels are higher today than before the outbreak (di Fronso et al., 2020; Liu et al., 2020). The pandemic has ultimately impacted education worldwide (Guillasper et al., 2020; Mondol & Mohiuddin, 2020), creating a toll on teachers' stress and job satisfaction.

Existing research on science teachers' narratives during a global health crisis, particularly the COVID-19 pandemic, and the correlation between their perceived stress and satisfaction levels remains limited. Understanding how COVID-19 has impacted individuals in a country like the Philippines is essential. This study aimed to investigate the relationship between job satisfaction and perceived stress among senior high school science teachers and explore their experiences during the pandemic.

By providing baseline data and fostering support through suggested interventions, this paper may be able to assist the Department of Education in potentially reducing teacher stress. Addressing stress and job satisfaction concerns of teachers may enable educational leaders to develop future professional development activities and support services that effectively cater to the needs of all educators. Ultimately, this research may contribute to helping teachers manage stress and find joy in their teaching profession.

Literature Review

Every person and society depend on education. It fosters optimistic thinking and prepares a nation for social, economic, and personal growth. Educational institutions - the foundation of society - ensure proper physical, cognitive, emotional, and social development. Education helps students socialize and preserve a society's cultural history (Ellis, 2019). Teachers are essential to a functioning education system and student learning. They help implement educational practices that educate the nation's most important assets—students. They help educational systems achieve their goals, influencing performance (Barron et al., 2023).

Despite their crucial role, teaching is regarded as one of the most rewarding yet challenging professions. Due to dynamic educational reforms, teacher occupational stress has become increasingly prevalent in recent years. Teachers in secondary schools face a variety of daily stresses, resulting in different levels of work stress. Globally, education is becoming a more demanding profession. Agyapong et al. (2022) indicates that teaching is one of the most stressful professions in the world.

Teacher stress encompasses unpleasant emotions and negative experiences associated with their teaching career (Carroll et al., 2022). Teachers face significant stress for various reasons, including our country's constantly changing educational policies, difficulties in proper implementation, physical constraints, and other inadequacies that teachers face. In essence, stress for teachers is any situation that puts their mental or physical health in danger. Stress can cause teachers to miss work, impairing behavior management and instruction (Ozamiz-Etxebarria et al., 2021).

Job satisfaction is the emotional state of employees resulting from their perceptions of their work (Haver et al., 2019). Harmonious employee expectations and job requirements create a positive work environment and high job satisfaction. Park and Johnson (2019) stated that job satisfaction promotes productivity and reduces employee attrition. When teachers are content with their work, they create a positive learning environment that fosters student engagement and academic achievement.

Consequently, job satisfaction helps teachers achieve the institution's goals, mission, and vision. Educational system goals depend on teachers' work satisfaction. The Governance of Basic Education Act of 2001 inspired DepEd Order (DO) No. 44, series of 2015. Its main goal is to improve communication and school planning to increase school-based management participation and make educational services more efficient, effective, and responsive. A responsive and high-quality education depends on teachers. However, disgruntled educators often need more commitment. Teachers, especially in the secondary school levels, appear to be dissatisfied with teaching. Teacher satisfaction is significantly influenced by factors such as professional community, collaboration, autonomy, advancement, and professional development. These elements interact and influence one another, with opportunities for growth and advancement playing a particularly vital role in enhancing science teachers' job satisfaction and, in turn, their performance (Bhat, 2020).

Along the same lines, the study by Mbonea et al. (2021) disclosed that pay, promotional opportunities, job conditions, and job security affect job satisfaction. They argued that to raise the job satisfaction level for teachers, just compensation, equal growth and promotion, a good working atmosphere, welcoming attitudes from educational leaders, and good working atmosphere should be given utmost priority.

Özcan (2022) investigated secondary school teachers' job satisfaction levels. The paper showed that the teachers' satisfaction is generally "satisfied." It revealed that success,

appreciation, merit and promotion, motivation, and recognition, working conditions, and management impacted teachers' job satisfaction. Further, Glaveli et al. (2023) study demonstrated that salary/income, collegial relations, and leadership, personal opportunities, work intensity/load are crucial for teachers' job satisfaction.

In the context of the COVID-19 pandemic, Jones et al. (2022) provided a concrete proof of teachers' work before and after a pandemic. The findings demonstrated a significant decrease in teachers' instructional time teaching daily, replaced by more planning, paperwork, and interactions with fellow co-teachers and parents. Students learning difficulties in following instructions, learning quality transfer, health risks in distance learning, and power and internet disruption are among the numerous challenges teachers face during the pandemic (Agayon et al., 2022). The results provide similarities to the study of Rabacal et al. (2020) that personal safety and the disruption of quality of life were among the most significant impacts felt by Filipino teachers, perceived as a moderate to a high threat of COVID-19.

Pham et al. (2021) highlighted the important contributions of stakeholder support, the readiness of schools for digital transformation, and teachers' concerns about teacher satisfaction. Additionally, Chin et al. (2022) demonstrated that teachers' professional growth mainly focuses on developing their information literacy, online teaching, and research skills. Furthermore, it showed that the main obstacles to professional development were time and monetary restraints, a lack of teacher enthusiasm, and logistical difficulties.

More precisely, the empirical study of Cahapay and Labrador (2021) on remote science education during the COVID-19 crisis revealed four themes: (1) difficulties in lesson presentation; (2) problems of lesson remote lesson delivery; (3) instructional adjustments in teaching science, and (4) provide systemic support for teaching improvements. The professional well-being of teachers is also affected by significant and prolonged student interactions (lack of desire to learn, lack of discipline), organizational characteristics (lack of appreciation from managers and co-workers, time constraints, and lack of material resources), and individual factors (low self-confidence and self-esteem). Falcon (2020) found that respect and work complexity affect teachers' job satisfaction. The findings supported the idea that if teachers understood their duties and expectations, they could better decide how to enhance school productivity (Bona, 2020).

Vargar-Rubilar and Oros (2021) investigated stress and burnout in teachers during the pandemic. The findings indicated that work overload, uncertainty regarding the impacts of the pandemic, and a poor work setting were the primary contributors to stress. Unwanted psychophysical symptoms appeared more frequently the more stress individuals experienced. Teachers who experienced greater stress and more psychophysical signs of discomfort had higher rates of professional burnout. Bravo et al. (2021) further indicated that public school teachers experience burnout for several reasons, including their workload, fatigue, emotional toll, and lack of enthusiasm.

Teachers experienced work overload in the profession, but they characterized it as an amalgam of teaching and non-teaching-related responsibilities, as revealed in the study of Geronimo and Olegario (2020). In addition to the multitude of tasks, it has been observed that teachers become uninspired when they believe their extra responsibilities are no longer necessary for their primary role as educators. Teachers are likewise faced with a challenge due to the situation's difficulties. However, instead of being enthusiastic about the problem, they are fearful and doubtful because of the task's difficulty and lack of available information. Teachers start to wonder if they can perform adequately in the circumstances. The fear of potentially negative consequences, such as making mistakes and receiving criticism, indicates resistance on the part of the teachers. Apart from this, Dureza's et al. (2022) research revealed that the hybrid approach to instruction and learning had an adverse effect on teachers' preparation. They had to invest much time and money in planning since engaging students requires multiple tools, platforms, and strategies. The extra administrative and clerical work has made secondary school teachers even more worn out and under strain each day.

According to Dangle's (2020) paper on modular distance learning in public secondary schools in the Philippines, the biggest obstacles to implementation were lack of parental guidance, students' trouble with self-regulated learning, and inadequacies of school funding for module delivery and production. Wisanti et al. (2021) determined the challenges science teachers face when doing online learning and discussed their efforts to do this throughout the COVID-19 pandemic. The findings indicated that most science teachers (77.5%) had trouble handling online learning. This problem was caused mainly by students, parents, and technology. The internet connection was the most significant technological barrier (42.4%) to online learning. By 21.5%, students faced other challenges, such as low motivation, subpar time management abilities, and a lack of communication tools like smartphones. The third reason is that teachers were responsible for 36.1% of the challenges, primarily because of their use of online learning tools and their need to better understand concepts.

Research has stated that employees become happy and satisfied when they can make fuller use of their abilities. Bahtilla and Hui (2021) mentioned that school policies and infrastructure form part of working conditions that affect the satisfaction of teachers towards their job. Sound policies and teacher empowerment comprise working conditions. Inadequacies among the conditions impact job satisfaction negatively.

Further, several studies point out a significant and inverse relationship between satisfaction and stress among teachers in Arkansas (Shoulders et al., 2021) and India (Chitra, 2020) during the COVID-19 pandemic. The shifts in routine spurred caused by the COVID-19 pandemic, as reported by Bulińska-Stangrecka and Bagieńska, (2021), alienated employees not only physically but also psychologically. Due to a lack of social interaction and physical support, psychological isolation has contributed to a sense of emotional inadequacy, decreased job satisfaction, and raised anxiety levels. Labrado et al. (2022) focused on public school teachers' job satisfaction and stress levels. The study revealed that teachers' workload and stress levels increased significantly during the transition to distance learning. Teachers were content with their professions despite the strain and added responsibilities the pandemic had brought about.

In Leyte, the sources of stress and aspects affecting job satisfaction were identified by Rosas et al.'s (2020) study. It was discovered that the students' lousy attitude toward education, disruptive conduct, and rudeness caused the teachers the most occupational stress. Secondary teachers were content with their jobs, especially the school's security, including location, security procedures, and policies.

Teachers are the linchpin of the educational process, serving as navigators of the teaching-learning endeavor. It is evident that stressed and dissatisfied teachers cannot effectively fulfill their duties. Job satisfaction is a fundamental requirement for any profession, and teachers, as the primary architects of the educational process, must be content and fulfilled in their roles. In any educational setting, the attainment of goals and objectives is contingent upon teacher satisfaction.

Existing literature and research on teacher stress and job satisfaction have provided valuable insights, particularly within public elementary and secondary schools. However, a notable gap exists in the research on the satisfaction and stress levels of Senior High School Science teachers in the Philippines, specifically within the context of science instruction. This study underscores the importance of investigating the relationship between perceived stress and job satisfaction among these educators, as well as exploring their narratives and experiences in science teaching during a global health crisis.

Theoretical framework

The theoretical underpinning of this study is anchored on Person-Environment Fit Theory by Murell and Norris, Hierarchy of Needs by Abraham Maslow, and Herzberg's Hygiene-Motivation Theory (as cited in Ragma & Legaspi, 2017). The World Health Organization defines stress as the response individuals experience when faced with pressures and demands that exceed their perceived abilities, challenging

their coping mechanisms. This concept aligns with the Person-Environment Fit Theory, which posits that stress arises when there is a mismatch between an individual's skills and the demands of their environment. It directs that stress is generated by an imbalance of an individual's qualities, resources, and abilities with job expectations (Edwards & Cooper, 2013). The statement expounds that when teachers cannot do the job well, they are more likely to feel stress. This theory is connected to the study because it can be a determinant in understanding different perceived work stressors a teacher may face in his environment.

Job satisfaction, on the contrary, is the pleasurable emotional condition that results from assessing a person's job as enabling or achieving the fulfillment of his/her employment values and belief systems, or the degree to which people admire or detest their occupations (Kollman et al., 2020). For people to achieve that emotional state and like their jobs, needs must be fulfilled first. This is connected to Maslow's needs hierarchy theory which states that human needs are constructed through a five-level hierarchy composing physiological conditions, safety, belongingness/love, esteem, and self-actualization. Further, this theory postulates that essential needs need to be satisfied first before dealing with the more complex ones. The Hierarchy of Needs by Maslow is formulated to describe human motivation, but its principal beliefs are also applicable in work atmosphere and guide the study. When the needs are fulfilled, employees can focus on having that sense of belongingness towards their workplace. It is connected to the study because it gives them things that may influence job satisfaction.

Meanwhile, Herzberg's Hygiene-Motivation Theory (Herzberg, 1966) explains that "job satisfaction and dissatisfaction are not two opposite ends of the same continuum but are two separate and, at times, even unrelated concepts". Salaries and incentives, achievements and recognitions are motivating factors that must be met for an employee to be satisfied with work. Hygiene Factors, on the contrary, (such as working climate, organizational structure, job tenure, employee engagement, and management quality) are linked to job dissatisfaction.

This theory asserts that motivation and hygiene factors are considered independent, and employees may be neither satisfied nor dissatisfied, making them neutral. The theory is connected because it can be a tool in assessing a teacher regarding his/her satisfaction, be it satisfied, dissatisfied or neutral. Generally, stress is regarded as an antecedent of job satisfaction, and the two constructs have been treated as related (Brewer & McMaha-Landers, 2003). Job satisfaction generally increases when workplace stress is low or absent. Conversely, high levels of perceived stress are often associated with job dissatisfaction. While stress and job satisfaction have an inverse relationship, they also share certain characteristics.

Statement of the Problem

This explanatory sequential mixed methods study examined the relationship between levels of science teaching satisfaction and perceived stress and explored the factors that contribute to the satisfaction and stress in relation to science teaching among senior high school science teachers in one city division in Eastern Visayas.

Specifically, the study sought to address the following questions:

1. What is the teachers' level of satisfaction in science teaching?
2. What is the teachers' perceived level of stress in relation to science teaching?
3. Is there a significant difference between satisfaction and perceived stress among education graduates and non-education graduates who are teaching sciences?
4. Is there a significant relationship between teachers' satisfaction and stress level?
5. What factors impact teachers' satisfaction in science teaching?
6. What contributes to teachers' perceived stress in relation to science teaching?
7. What do the teachers suggest to reduce stress in relation to science teaching?

Methods

This study utilized an explanatory sequential mixed methods design with two data

collection phases. This research design involves gathering, evaluating, and bringing together quantitative and qualitative data in the research process within a single study to elucidate better the research problem (Creswell & Creswell, 2018).

Forty-nine (49) senior high school science teachers were identified through total enumeration technique. In the qualitative phase, the recruitment of twelve (12) teachers for in-depth interviews was carried out to further elaborate quantitative data. The inclusion criteria for selecting respondents in the study were: (1) a public school teacher in the Philippines, (2) currently employed as a SHS science teacher, (3) teaching science subjects in the senior high school, and (4) willing to participate in the study.

Ethical approval for the study was obtained from the Division Superintendent through the Division Research and Planning Office. Permission letters were sent to the principals of the selected senior high schools to facilitate teacher participation. Informed consent was explained in detail to each teacher-respondent, outlining the aims and purpose of the study. Their completion of the survey and full participation in the interviews were considered as their agreement to participate in the research.

The quantitative phase utilized standardized survey instruments to collect data. The first section was adopted from the COVID-19 Perceived Stress Scale (COVID-19 PSS-10) by Campo-Arias et al. (2020). It consists of ten items and is intended to gauge how much a person feels their life is out of control, unpredictable, and overloaded. The final component of the survey instrument was the Minnesota Satisfaction Questionnaire (MSQ) - Short Form by Weiss et al. (1967). This instrument is a well-established measure of job satisfaction that connects employee satisfaction to extrinsic and intrinsic factors. In the qualitative phase, researchers employed a researcher-made interview protocol in order to extract detailed information. To ensure reliability, the questions were reviewed and validated by experts.

Frequencies, weighted means, and standard deviations were calculated for the descriptive results in perceived stress and job satisfaction levels. Independent samples t-test was employed to test for the difference in satisfaction and perceived stress between education and non-teacher education graduates. Moreover, Pearson product-moment correlation was performed to test for correlation between perceived stress and job satisfaction at 0.05 level of significance. Further, the qualitative data gathered from in-depth interviews were analyzed using thematic analysis espoused by Braun and Clarke (2006). The steps included: (1) becoming familiar with the data, (2) generating codes, (3) searching for themes, (4) reviewing themes and then (5) defining themes. In order to establish a clear connection between the qualitative and quantitative data, a statistics-by-theme joint display was created to illustrate how the themes and codes from the qualitative data provide additional insights into the statistical findings.

Results and Discussion

Table 1. Level of satisfaction in science teaching

	Statements	M	*SD*	Descriptive Equivalent
1.	Being able to keep myself busy all the time.	3.73	0.78	Satisfied
2.	The chance to work alone on the job.	3.84	0.77	Satisfied
3.	The chance to do different things from time to time.	3.84	0.84	Satisfied
4.	The chance to be "somebody" in the community.	3.45	0.90	Satisfied
5.	The way my superior handles his/her workers.	3.22	1.22	Neutral
6.	The competence of my supervisor in making decisions.	3.29	1.07	Neutral
7.	Being able to do things that don't go against my conscience.	3.53	1.09	Satisfied

Statements	M	*SD*	Descriptive Equivalent
8. The way my job provides for steady employment.	3.84	0.93	Satisfied
9. The chance to do things for other people.	4.04	0.64	Satisfied
10. The chance to tell people what to do.	3.69	0.65	Satisfied
11. The chance to do something that makes use of my abilities.	4.10	0.71	Satisfied
12. The way school policies are put into practice.	3.08	0.88	Neutral
13. My pay and the amount of work I do.	3.14	1.03	Neutral
14. The chances for advancement of this job.	3.02	0.87	Neutral
15. The freedom to use my own judgement.	3.35	0.82	Neutral
16. The chance to try my own methods of doing the job.	3.76	0.80	Satisfied
17. The working conditions.	3.08	0.94	Neutral
18. The way my co-worker gets along with each other.	3.69	0.89	Satisfied
19. The praise I get for doing a good job.	3.55	1.03	Satisfied
20. The feeling of accomplishment I get from the job.	3.80	1.01	Satisfied
Total	71.04		Average Satisfaction

Table 1 summarizes the descriptive statistics for the 20-item Job Satisfaction Questionnaire (MSQ-SF), which measured the level of satisfaction in science teaching among senior high school science teachers. Seven out of twenty indicators, or 35%, obtained a "neutral" level, while 65% of the measures got a "satisfied" level rating. As shown in the table, *"The chance to do something that makes use of my abilities"* yielded the highest mean score of 4.10 (*SD*=0.71), followed by *"The chance to do things for other people"* with 4.04 (*SD*=0.64). The data suggests that when science teachers can share knowledge with their students and see that they are learning, they become satisfied with the teaching profession. These findings support Oco's (2022) premise that when employees can make fuller use of their abilities, they tend to become happy and satisfied in their job.

On the other hand, the lowest mean score was 3.02 (*SD*=0.87), pertaining to *"The chances for the advancement of this job,"* followed by *"The working conditions"* and *"The way school policies are put into practice,"* both with a mean score of 3.08. The result implies that science teachers are neutral about their working atmosphere and how school policies are implemented. The results support the studies mentioned that school policies and infrastructure form part of working conditions (Bahtilla & Hui, 2021). Teachers' job satisfaction is directly influenced by the quality of their working environment, which includes supportive policies and opportunities for professional growth and autonomy (Ortan et al., 2021a). Overall, table 1 shows that the science teachers have an average level (= 71.04; *SD*=10.84) of satisfaction with science teaching.

Table 2. Distribution of science teachers by level of job satisfaction

Level of Job Satisfaction	f (n=49)	%
High (25 to 40)	19	38.8
Average (15 to 24)	30	61.2

Mean = 71.04, SD = 10.84

Table 2 shows that 38.8% (n=19) of SHS science teachers are highly satisfied with science teaching, and 61.2% (n=30) had average satisfaction. The computed mean score in the job

satisfaction questionnaire was 71.04 (*SD*=10.84), described as average satisfaction. The results in this table imply that the majority of science teachers are satisfied with the teaching profession. A supportive school environment characterized by adequate resources, collaboration, positive discipline, and professional growth opportunities significantly enhances science teacher satisfaction (Mostafa & Pál, 2018).

Table 3. Level of COVID-19 perceived stress

Statements	M	*SD*	Descriptive Equivalent
1. I have felt as if something serious was going to happen unexpectedly with the pandemic.	2.47	0.79	Fairly Often
2. I have felt that I am unable to control the important things in my life because of the pandemic.	2.18	0.92	Sometimes
3. I have felt nervous or stressed about the pandemic.	2.53	0.84	Fairly Often
4. I have been confident about my ability to handle my personal problems related to the pandemic.	1.29	0.83	Almost Never
5. I have felt optimistic that things are going well with the pandemic.	1.29	0.90	Almost Never
6. I have felt unable to cope with the things I have to do to monitor for a possible infection.	2.08	0.97	Sometimes
7. I have felt that I can control the difficulties that could appear in my life as a result of the infection.	1.65	0.80	Sometimes
8. I have felt that I have everything under control in relation to the pandemic.	1.78	0.79	Sometimes
9. I have been upset that things related to the pandemic are out of my control.	2.16	1.00	Sometimes
10. I have felt that the difficulties are increasing in these days of the pandemic, and I feel unable to overcome them.	1.94	0.89	Sometimes
Total	19.37		Moderate Stress

Legend: 0-14 – Low Stress; 15-24 – Moderate Stress; 25-40 – High Stress

Table 3 displays descriptive results for the 10-item COVID-19 Perceived Stress Scale (COVID-19 PSS-10), which measured the level of perceived stress in senior high school science teachers. Two out of ten or 20% of the indicators are described as "fairly often." Six out of ten or 60% of the indicators got the descriptive interpretation of "sometimes," while two out of ten or 20% of the indicators belong to "almost never".

As shown in the table, getting the highest mean score of 2.53 (*SD*=0.84) was "*I have felt nervous or stressed about the pandemic,"* followed by *"I have felt as if something serious was going to happen unexpectedly with the pandemic,"* with a mean score of 2.47 (*SD*=0.79). The data affirms that the pandemic thus bothers science teachers primarily because of schools' abrupt transition and closure, making it difficult to establish an authentic teaching-learning process in science education while navigating their personal lives. The results demonstrate similarities in the study of Rabacal et al. (2020) that personal safety and the disruption of quality of life were among the most significant impacts felt by Filipino teachers, perceived as a moderate to a high threat of COVID-19.

Furthermore, Zhang and Ma's (2020) study in China revealed that the participants felt apprehensive and horrified due to the pandemic. In contrast, the lowest mean score was 1.29 (*SD*=0.83; *SD*=0.9), both pertaining to *"I have been confident about my ability to handle my personal problems related to the pandemic"* and "*I have felt optimistic that things are going well with the pandemic*." The study revealed that science teachers faced significant challenges

adapting to the pandemic, particularly in managing student needs, adjusting workloads, and navigating major shifts in the educational system. These challenges contributed to a heightened level of stress among teachers, as they struggled to adapt to new norms and comply with rapidly changing standards, including the increased use of technology. Overall, table 3 shows that the science teachers have a moderate level (= 19.37; *SD*=5.29) of perceived stress in science teaching.

Table 4. Distribution of science teachers by level of COVID-19 perceived stress

Level of Perceived Stress	**f (n=49)**	**%**
High (25 to 40)	8	16.3
Moderate (15 to 24)	35	71.4
Low (0 to 14)	6	12.2

Mean = 19.37, SD = 5.29

Table 4 indicates that 12.2%, or 6 teachers, experienced low COVID-19 perceived stress, 71.4% (n=35) experienced moderate stress, and 16.3% (n=8) experienced high COVID-19 perceived stress. The mean score on the COVID-19 PSS-10 was 19.37 (*SD* = 5.29). The data indicate that science teachers have a moderate perception of the tension associated with teaching science. Moreover, compared to other professions, teachers report higher levels of tension and psychosomatic illnesses (Wettstein et al., 2021). According to research conducted over the past several decades, teachers experience above-average levels of stress, which is associated with greater burnout and reduced teacher retention (Collie & Mansfield, 2022).

Table 5. Independent samples t-test of levels of perceived stress between education and non-teacher education graduates

Classification of Science Teachers	**N**	**M**	**SD**	**df**	**t**	**p-value**
Education Graduates	28	19.14	5.08	47	-0.34	.738
Non-Teacher Education Graduates	21	19.67	5.80			

Table 5 shows the difference between perceived stress levels among education and non-teacher education graduates. SHS science teachers who were education graduates (n=28), on average, scored 19.14 (*SD*=5.08) in the COVID-19 PSS-10, while non-teacher education graduates (n =21) had an average score of 19.67 (*SD*=5.80). The result, t(47) = 0.34, p = .738, indicates a failure to reject Ho1; hence there is no significant difference between education and non-teacher education graduates in COVID-19 perceived stress. The result implies that teacher and non-teacher education graduates have comparatively similar stress levels in science teaching. The data affirms Daguplo's (2013) study that modern teachers filling the nation's classrooms in the Philippines are second-career teachers, which includes teachers who did not graduate with a teacher education degree.

Table 6. Independent samples t-test of levels of science teaching satisfaction between education and non-teacher education graduates

Classification of Science Teachers	**N**	**M**	**SD**	**df**	**t**	**p-value**
Education Graduates	28	70.54	10.48	47	-0.37	.714
Non-Teacher Education Graduates	21	71.71	11.79			

Table 6 exhibits the difference between levels of job satisfaction of education and non-teacher education graduates. The education graduates (n=28) scored 70.54 (*SD*=10.48) on average in the job satisfaction survey. On the other hand, non-teacher education graduates (n=21) had an average score of 71.71 (*SD*=11.79). The values, t(47) = -0.37, p = .714, indicates a failure to reject Ho1; hence there is no significant difference between education and non-teacher education graduates in terms of science teaching satisfaction. The data further entails that teacher and non-teacher education graduates experience average job satisfaction in teaching the sciences.

Table 7. Correlation between levels of science teaching satisfaction and perceived stress

	N	*r*	*p*	Significance Level at 0.05
Job Satisfaction and Perceived Stress	49	-0.197	0.175	Not significant

A Pearson's r data analysis on science teaching satisfaction and perceived stress revealed a non-significant negative correlation, r (47) = .197, p = .175. It indicates that Pearson's r result accepts the Ho2; hence there is no significant relationship between science teaching satisfaction and perceived stress among science teachers. This data moreover provides that as teachers' stress levels increase, their job satisfaction decreases. The result of this study supported previous finding which found a non-significant but inverse correlation between perceived stress and job satisfaction among Filipino public school teachers (Ragma & Legaspi, 2017). This denotes that their job satisfaction will not necessarily degrade when teachers are stressed. Despite the stressors they encounter as science teachers, they can still be content and satisfied with what their job gives them.

However, some studies revealed a significant and inverse relationship between satisfaction and stress among teachers in Arkansas (Shoulders et al., 2021) and India (Chitra, 2020) during the COVID-19 pandemic. Due to a lack of social interaction and physical support, psychological isolation has contributed to a sense of emotional inadequacy, decreasing job satisfaction. According to Giorgi et al. (2020), the pandemic significantly altered work situations due to social restrictions, enforced lockdowns, fear of contracting an illness, cessation of productive activity, loss of income, and fear of the future. The result implies that other factors may bring content despite the stress and dissatisfaction they face as science teachers. As reflected in the job satisfaction scale, the chance to use their abilities and the opportunity to influence people can make them content with their job.

Factors that impact teachers' satisfaction in science teaching

The quantitative phase reported the perceived stress and job satisfaction levels in science teaching and the relationship between the variables. In-depth interviews and focus group discussions were conducted with twelve (12) Senior High School Science teachers to explore the factors that impact their job satisfaction in science teaching. From the thematic analysis done, the following themes emerged: (a) workplace culture, (b) when students learn, (c) good compensation with promotion, and (d) professional development program.

Workplace Culture (Theme 1): The participants revealed that being recognized and complimented on their work contributes to job satisfaction. Recognition and interpersonal communication allow them to perform better as science teachers. The participants opined that these are pivotal elements that navigate attitudes and behavior for better work performance and satisfaction. In fact, participant 2 expressed that *"being recognized is good because after all the hard work you put in teaching, it would be nice if your immediate supervisors would tell you that they appreciate your work and efforts."* Moreover, participant 7 said that "*once your efforts are recognized, it gives you the motivation to do more or to do better*". The interviews support Tolliver's (2019) study on teachers' satisfaction in teaching, indicating

that the need for emotional support from mentors and administrators can augment job satisfaction.

When Students Learn (Theme 2): Students' learning experiences were revealed to impact science teaching satisfaction positively. The participants shared the satisfaction they felt from seeing students learn the topics presented to them and share the knowledge they learned. They stated that when students manifest the knowledge and concepts learned through discussions and they can answer and thoroughly explain ideas, they become satisfied with their job as teachers. Participant 4 and 5 manifested that *"they are happy and satisfied seeing their students learn the topics being shared to them"*. These viewpoints on seeing students learn is aligned with Zhang's (2023) study that teachers' satisfaction is exemplified when they see that students learn from their lessons and discussions. Lesson acquisition can be accomplished more quickly with the support of teachers.

Good Compensation with Promotion (Theme 3): The interview responses disclosed that pay and work promotion are vital factors of job satisfaction. Teachers cited that when given the right amount of monetary compensation and an opportunity for job promotion, they feel more satisfied. As shared by participant 1, "*being well-compensated equates to job satisfaction"*, which means that salary is a motivating factor for science teachers to work. She says, *"job satisfaction is that you are satisfied, and you are well-compensated."* Teachers are more likely to be satisfied with their jobs when they perceive their salaries as sufficient to meet their financial needs and maintain their desired quality of life. Previous studies support that teachers' satisfaction depends on salary and compensation (Abdurahman, 2023; Glaveli et al., 2023).

Professional Development Program (Theme 4): The need for professional growth was also revealed as a factor affecting satisfaction in science teaching. Many teachers express a sense of stagnation and limited opportunities for advancement in their teaching careers. As discussed by participant 2, *"work promotion is difficult, especially if you have no established connections within the department.'* Participant 3 also believes that "*their positions as special science teachers remain stagnant because no career progression is available for them in DepEd*." Lack of opportunities for promotion and professional growth can lead to feelings of stagnation and dissatisfaction among teachers. Advancement and development within the workplace are known to positively influence employee performance, as demonstrated by Bhat (2020).

Contributory factors to teachers' perceived stress in science teaching

The following key themes emerged as regards the contributing factors to teachers' perceived stress in science teaching: (a) the COVID-19 pandemic, (b) teaching and learning resources, (c) limited contact hours, (d) urgent submission of reports and other paperwork, (e) students' behavior and attitudes towards studies, and (f) teacher-specific factors.

COVID-19 pandemic (Theme 1): Responses from the interviews highlighted the challenges science teachers face due to the unprecedented existence of the pandemic. Teachers struggled to adjust to the teaching-learning instruction due to abrupt transitions, making it difficult to establish an authentic learning delivery. Participant 4 expressed, *"we are not prepared for a pandemic, the set-up from face-to-face to online, students are not prepared for that, and there are many teachers who are not even adept with technology".* Also, participant 7 indicated that "*even teachers are not prepared to do online classes."* Students' learning difficulties in following instructions, learning quality transfer, distance learning, and power and internet disruption are among the numerous challenges teachers face during the pandemic (Agayon et al., 2022).

Teaching and Learning Resources (Theme 2): Participants expressed concerns about inadequate teaching resources that hinder their ability to effectively facilitate learning. They emphasized the importance of readily available materials, such as books and laboratory equipment, to support high expectations for science teacher performance. As participant 10 asserted, *"the expectations to us science teachers to perform excellently without giving us the support in terms of materials and equipment*

to be used in the laboratory, specifically that we are in science teaching." Instructional materials' utilization in science has shown a meaningful and profound effect on students' academic achievement in the aspect of science process skills, knowledge, and attitudes (Asrizal et al., 2019).

Limited Contact Hours (Theme 3): Limited exposure to students is also a factor that impacts the teaching and learning activity. Two of the responses shared by the participants were attributed to the *"limited time frame in teaching science"*, which is not enough due to the intricacies of the lessons embedded in the competencies. The pandemic demonstrated a significant decrease in teachers' instructional time teaching daily, replaced by more planning, paperwork, and interactions with fellow co-teachers and parents (Jones et al., 2022). The findings suggest that science teachers believe that meaningful learning experiences in science require a holistic approach that goes beyond simply allocating instructional time and covering subject content.

Urgent Submission of Reports and Other Paperwork (Theme 4): The participants noted how submissions of excessive reports and paperwork impact their stress levels. They highlighted that they do not get to effectively perform their function as teachers because of the abrupt submission of reports and school documents. Participants reported that they frequently receive requests for redundant data, which can be time-consuming and inefficient. As expressed by participant 11, "*the paperwork that sometimes you cannot even understand the purpose of it since it becomes repetitive already"*. The sentiments are consistent with studies that have already been done on the stress and burnout that teachers experience because of their excessive workloads and abrupt paperwork (Falcon, 2020). In the Philippines, studies reported that teachers have a high level of workload and a great extent of teaching-related paperwork, which impacts occupational stress (Jomuad et al., 2021; Hundani & Toquero, 2021; McCarthy, 2022).

Students' Behavior and Attitudes Towards Studies (Theme 5): Teachers shared that student behavior and attitudes can be a significant source of stress. They believe that these behaviors are influenced, in part, by Department of Education policies. Specifically, child protection policies can hinder teachers' ability to address student misbehavior effectively, as they fear potential penalties. In fact, participant 10 said "*the attitude of the students towards education itself, as well as the policy of DepEd specifically highlighting the "no children left behind policy", which is sometimes being romanticized to mass promote children even though they are not performing well, or at least doing the bare minimum to pass the subject."*

Teacher-specific Factors (Theme 6): Many participants expressed doubts about their future in teaching, citing factors such as decreased motivation, a mismatch between their qualifications and job demands, and the challenges brought about by the pandemic. These factors have contributed to increased stress, influencing their job satisfaction and productivity. Science teachers' lack of motivation to work is greatly impacted by the feeling of stress brought about by overwhelming tasks given to them. As participant 10 stated, *"loss of motivation and willingness to teach, and lack of interest to share concepts to my students."* The statement suggests that science teachers may experience burnout or a lack of engagement with their profession, eventually leading to decreased motivation and a disinterest in teaching.

Teachers' suggestions in reducing stress in science teaching

According to the participants, the following should be done to reduce the perceived stress felt in science teaching: (a) maintain work-life balance, (b) exercise proper time management, (c) let teachers teach, and (d) promote collaboration among science teachers. As revealed by the quantitative results that perceived stress is ubiquitous among science teachers, teacher-participants recommended the following to address the identified issues:

Maintain Work-Life Balance (Theme 1): Maintaining a healthy work-life balance is essential for improving teachers' effectiveness and satisfaction in the context of teaching and learning. A healthy work-life balance has repeatedly been demonstrated to contribute to faculty well-being. Participant 1 suggested that

"*whenever you feel stressed, you pause, you take time, give yourself a break*". Further, watching movies and establishing great conversations with friends and colleagues also help alleviate the stress of science teachers. Allowing yourself to enjoy life through watching movies and establishing meaning connections and conversations with colleagues and friends is one of the many ways to reduce stress in science teaching.

Exercise Proper Time Management (Theme 2): Proper time management is another suggestion that emerged during the interview. Science teachers recommend that working in advance with school-related work, being prepared with upcoming tasks, and properly setting a priority list with tasks at hand will help teachers better facilitate a sound work management plan.

Let Teachers Teach (Theme 3): The participants conveyed that removing heavy workloads, fewer paperwork submissions, hiring non-teaching staff, and allowing teachers to teach and focus on subjects they have expertise in are significant suggestions to lessen the stress felt by teachers in the department. The participants insinuated the need to remove unnecessary workload to effectively use the time for instruction and pedagogy. Moreover, they also suggested that educational managers must set a clear deadline before informing teachers of the reports that need to be submitted. Further, teachers also argued that they should be teaching subjects they have mastery of to better facilitate discussions and transfer or knowledge in the classroom.

Promote Collaboration Among Science Teachers (Theme 4): Having a good support group and collaborating with co-science teachers is one of the suggestions that emerged during the interview. Teachers suggested that there must be an establishment of an association – a circle – that will support science educators when it comes to science-related endeavors and the materials and resources needed by science teachers, among others. They also narrated that unity and communication as a way of working together help reduce stress in science teaching.

Table 8. Statistics-by-theme joint display for levels of perceived stress and job satisfaction in science teaching

Topics	Quantitative results *Means, SD*	Qualitative findings *Themes Evidence of Themes*	Mixed-Method Meta Inference
Average job satisfaction	The chance to do something that makes use of my abilities. *M=4.10* *SD=0.71* *(satisfied)*	**When Students Learn** *"When I can share my knowledge with them and when learning becomes easier for my students, that's my job satisfaction." (P1)* *"Seeing your students learn the topics you are sharing to them." (P5)*	Confirming Participants described their feelings that when they are able to fulfill their roles as teachers, it makes them satisfied, which confirmed the mean score defined as *'satisfied'* in the initial phase.
	The chances for the advancement of this job. *M=3.02* *SD=0.87* *(neutral)*	**Professional Development Program** *"I feel like I am stagnant in my current career, I don't feel like I am growing professionally." (P10)* *"…looking at the DepEd, it's hard for you to be promoted,*	Expanding Participants expressed the feeling of career stagnation, impacting their satisfaction as teachers. The mean score indicated an agreement with these realizations.

Topics	Quantitative results *Means, SD*	Qualitative findings *Themes Evidence of Themes*	Mixed-Method Meta Inference
		and if you are not known, you will never be promoted" (P2)	
Moderate perceived stress	I have felt nervous or stressed about the pandemic. *M=2.53 SD=0.84 (fairly often)*	**COVID-19 pandemic** *"The pandemic is unprecedented; we are not ready for it. Even teachers are not prepared to do online classes." (P7)* *"I guess we are all not prepared for a pandemic, we are not that used to be in that kind of set-up." (P4)* *"…it's really difficult to teach science in modular learning, especially the concepts, they are of their own, so teachers aren't there to facilitate, to guide them" (P9)*	Expanding Participants identified the challenges that made them stressed and nervous amidst COVID-19. The mean score indicated that they 'fairly often' feel stressed and nervous during the time of global cataclysm. However, the quantitative survey did not include identifying particular stressors felt by teachers, which the qualitative inquiry further expanded, thus providing a vivid picture of the concept investigated.
	I have felt optimistic that things are going well with the pandemic. *M=1.29 SD=0.83 (almost never)*	**Teacher Factors** *"because if there's too many stressors, somehow I'm having second thoughts if I will still continue with this job or not" (P2)* *"loss of motivation and willingness to teach, and lack of interest to share concepts to my students" (P10)*	Expanding Participants expressed that their motivation and willingness were affected due to the stressors present. The mean score result was confirmed through the phenomenological interview that teachers have been less optimistic that things are going well with the pandemic.
Stress is negatively correlated with job satisfaction	Perceived stress level is negatively correlated with job satisfaction (r (47) = −.197, p > 0.05).	*"I think stress always impacts in a negative way to job satisfaction because even though you are satisfied with your salary, satisfied with your professional development and personal development needs but if you are experiencing stressors in your workplace, it*	Expanding Participants disclosed not only the inverse relationship of stress and satisfaction, but also expanded the factors and effects that caused the teachers to feel it that way; hence, providing a

Topics	Quantitative results *Means, SD*	Qualitative findings *Themes Evidence of Themes*	Mixed-Method Meta Inference
		doesn't make the academe a great place to work." (P7) *"Stress is impacting me negatively because my work performance is not my 100% and I tend to procrastinate a lot because of stress, so yes, it is negative." (P3)* *"It really affects me negatively because if you're stressed, you can't work properly, can't think properly." (P5)*	more complete understanding of the concept.

Conclusion

Senior high school science teachers experience moderate perceived stress but are generally satisfied in the teaching profession. Overall, teachers experience satisfaction and stress regardless of educational background. Work atmosphere, student learning, pay and promotion, and development opportunities impact teachers' satisfaction. Also, the pandemic, instructional resources, teaching hours, reports and paperwork, students' behavior, and teacher factors contribute to teachers' perceived stress. The findings of this study provide valuable suggestions for reducing stress for science teachers to enjoy the teaching profession.

The authors recommend that educational leaders may maximize concerns over the welfare of the teachers through stress management programs and support services that will lessen science teachers' stress and alleviate overall job satisfaction. Relevant trainings may be formulated to develop and promote technical skills anchored on pedagogy and instruction, especially for teachers with a non-teacher education degree. Efforts can be made employing effective mechanisms relative to submissions of reports to lessen the heavy workload and paperwork given to teachers. In consultation with the Department of Budget and Management, the agency may propose the creation of additional non-teaching plantilla positions to augment the lack of office staff to do clerical tasks. DepEd may consider increasing the number of minutes for science subjects. Moreover, science teachers may focus on teaching students' scientific skills and concepts rather than dealing with a heavy workload, abrupt submissions of documents, and other paperwork. Creating an organization that will establish collaborative discussions between science teachers to create a support group that will aid in reducing stress in science teaching. Lastly, it is crucial to provide opportunities for leisure for science teachers to maintain a work-life balance to improve teachers' effectiveness and augment satisfaction in the teaching profession.

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