

Job Satisfaction of Secondary Education Science Teachers in the Prefecture of Attica

George Leontakianakos¹, Christian Vrachas²

¹4th High School of Halandri, Athens, Greece

²Faculty of Psychology, University of Philosophical and Social Sciences, Athens, Greece

Email: giorgosleontakianakos@gmail.com

How to cite this paper: Leontakianakos, G., & Vrachas, C. (2025). Job Satisfaction of Secondary Education Science Teachers in the Prefecture of Attica. *Psychology*, 16, 883-904.
<https://doi.org/10.4236/psych.2025.167051>

Received: March 6, 2025

Accepted: July 28, 2025

Published: July 31, 2025

Copyright © 2025 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).
<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Purpose of this work was to have an introductory look on the degree of professional satisfaction of secondary science teachers in the prefecture of Attica for the school year, 2022 - 2023, in relation to specific parameters (leadership, relationships with colleagues, salaries, workload, leadership, performance of students). There's a lack of Greek research focusing on the job satisfaction of science teachers active in secondary education. For this purpose, a quantitative, cross-sectional pilot study was conducted, using a constructed for measuring job satisfaction questionnaires. 88 teachers participated in the research, with the majority being Physicists who taught in the prefecture of Attica during the period of 2022 - 2023, aged 41-60 and with more than 10 years of work experience. The results showed that secondary school science teachers of Attica seemed professionally satisfied mainly with the nature of the profession, leadership and the relationships with colleagues. However, there are dissatisfied with the low wages, students' achievement in science courses and the overall workload.

Keywords

Job Satisfaction, Teachers, Natural Sciences, Student Performance, Teaching Methods, Greece

1. Introduction

1.1. Aspects of Job Satisfaction

Job satisfaction of secondary school science teachers is of key importance for their performance. The satisfaction the teachers receive from their educational activity is reflected on the quality of their work (Perera et al., 2022). Secondary school

teachers are charged with the task of ensuring that all students achieve scientific literacy (Armer, 2011). Therefore, as the teaching of scientific principles covers a wide area of human reality (understanding the biology of living organisms, natural phenomena, technological applications, etc.), it is vital to investigate those aspects that play an important role on the professional satisfaction of teachers. As long as they are content with what they do, this in turn manifests and has a positive effect on how students experience the educational process (Toropova et al., 2021).

In regard to the factors influencing the job satisfaction of secondary science teachers, workload, salary, relationship with colleagues, and the role of leadership play are decisive (Hean & Garrett, 2001; Armer, 2011; Bozeman et al., 2013; Gibbs-Harper, 2015). Studies have highlighted this exact relation, to the extent that those parameters may lead to the teacher intensifying their effort or, on the contrary, giving up their job (Grissom, 2011). Studies showcase the relation between job satisfaction and the relation among teachers. In some cases, the relevance is moderate (Armer, 2011), while in others significant (Toropova et al., 2021). Communication emerged as a critical factor, both between colleagues, as well as in the way management clarifies and emphasizes on the requirements and priorities (Armer, 2011; Gibbs-Harper, 2015).

The study by Bozeman et al. (2013) found that secondary science teachers expressed satisfaction with their relationships with other teachers and attributed this to the bonds they have developed. In an environment where competition or non-cooperative interactions prevail, not only does the sense of satisfaction decrease, but also professional burnout is enhanced (Armer, 2011). In the same direction, Den Brok et al. (2010) showed that science teachers perceive their collaboration level to be lower compared to teachers of other specialties.

In addition, the greater the workload assigned to teachers, the lower the sense of satisfaction they receive from exercising their educational duties (Armer, 2011; Toropova et al., 2021). In Park et al. (1994), more than half of the 146 science teachers who participated claimed that they are tasked with many chores related to classroom teaching. They expressed a desire to be burdened with less teaching load and to be relieved of non-teaching duties. Furthermore, they emphasized the need for teaching facilities and office space where they can efficiently complete their assignments and evaluate student tests. They also reported the challenges they face when it comes to conducting laboratory courses, particularly citing the time-consuming nature of experiment preparation as a barrier to assessing students' practical work (Park et al. 1994). To that extent, working conditions affect the way teachers experience their work. Stressful conditions, stressful conditions dramatically reduce job satisfaction (Armer, 2011).

As far as the leadership effect on teachers' job satisfaction is concerned, it has a positive impact when their superior (middle or high school principal) accurately defines the school's priorities and effectively manages the teaching

program (Armer, 2011; Gibbs-Harper, 2015). Similar to this is the positive attitude expressed by the participants towards the supervision and evaluation process (Hean & Garrett, 2001; Toropova et al., 2021). Furthermore, the research conducted by Hean & Garrett (2001) focusing on the job satisfaction of secondary school science teachers in Chile, brought about that leadership has a significant impact on employee satisfaction. Bozeman et al. (2013) reported that 60% of teachers expressed satisfaction with the support they received from school principals. By income we mean the basic salary, additional allowances, promotion, pension and any other monetary benefit deriving from work (Miller, 2018). It appears that the salary is the main criterion by which secondary school science teachers evaluate the quality of their work in this field (Armer, 2011). In fact, it is an influential factor that determines whether teachers will stay or leave their profession (Miller, 2018). According to Hean & Garrett (2001), most secondary science teachers express dissatisfaction with their wages.

A positive correlation was also found between job satisfaction and work engagement (“a positive, satisfying, work-related state of mind characterized by vigor, dedication, and focus”), which highlights the need for enabling a positive work environment and support by the superiors (Park & Johnson, 2019). On the contrary, a straightforward connection between teaching experience and professional satisfaction of natural science teachers is not deduced. In any case, the findings are contradictory and subjected to the conditions and differences among each country’s school system (Toropova et al., 2021). Finally, an important finding is included in Hean & Garrett (2001), according to which a fundamental source of job satisfaction for science teachers is working with students. More specifically, it relates to the relationship between self-efficacy and job satisfaction (Perera et al., 2022). At the same time, teachers’ sense of self-efficacy is linked to students’ performance and degree of success, and this is reflected (among other things) in the various teaching methods that teachers can employ in order to achieve better effectiveness (Perera et al., 2022). The fact that at the center of their work are young people and the possibility to play a crucial role in their education seems to have a decisive effect (Hean & Garrett, 2001).

Science teachers job satisfaction varies according to the demographics and professional profile. According to a study conducted by Luft & Roehrig (2005) younger teachers are often more enthusiastic, which is a result of their satisfaction deriving from the relationships they develop with their colleagues (Bozeman et al. 2013). At the same time, science teachers with years of experience and job stability tend to have higher levels of satisfaction compared to their younger counterparts (Van Maele & Van Houtte, 2012). This is mainly attributed to the stability of being in the profession for a period. Furthermore, as reported by Bozeman et al. (2013), when teachers develop relationships with their colleagues over time, they generally report higher levels of job satisfaction.

Hean & Garrett (2001) state that women are usually more satisfied with their salary compared to men. Mocheche et al. (2018) conducted a survey that focused on the number of secondary school science teachers, in which the levels of job satisfaction for permanent teachers were higher compared to the temporary ones. The research of Zimmerman et al. (1980) and Mwamwenda (1997) found that marriage is a positive factor for science teacher satisfaction, attributing that to a married science teacher experiencing a better quality of life. Further teacher education is widely recognized as the process of enhancing teaching practices. During their studies aspiring teachers are encouraged to improve their teaching skills and improve their working conditions (Armer, 2011; Pérez Fuentes et al., 2023). In addition, the research of Green & Muñoz (2016) shows that teachers who have a higher degree, a master or a doctorate, tend to evaluate better their teaching work.

In order to investigate the relationship between science teachers job satisfaction and aspects of their work, the researchers provided a variety of tools. Armer (2011) administered the job satisfaction questionnaire (JSS), including parameters such as salary, promotion, colleagues, working conditions, etc. In the research of Perera et al. (2022) quantitative data were collected by administering a 35-minute questionnaire related to demographics, teaching practices and self-efficacy perception. In Gibbs-Harper's (Gibbs-Harper, 2015) research, two different questionnaires were administered: a) the PIMRS (Hallinger's Core Instructional Management Rating Scale), which consists of 50 closed-ended questions that measure perceptions regarding school curriculum management, defining school's goal and promoting a positive teaching atmosphere, b) the TJSQ (Lester's Teacher Professional Satisfaction Questionnaire), which consists of 77 graded closed-ended questions. In Miller's (Miller, 2018) research the FAJSTR questionnaire was used, consisting of 35 questions investigating the degree of job satisfaction. On the other hand, Hean & Garrett (2001) utilized a combination of open and closed type questions. In particular, in order to investigate the degree of professional satisfaction experienced by the participating teachers, an open-ended and graded questions questionnaire (Teacher Professional Study) was administered.

The relation between job satisfaction, work commitment and intention to leave the teaching profession, was studied by Park and Johnson (2019) via the following scales: a) for job satisfaction, the short version of the MSQ (Minnesota Satisfaction Questionnaire), consisting of 20 closed-type questions ranging from 1 (not satisfied) to 5 (extremely satisfied), b) for work engagement, the short version of the UWES (Utrecht Work Engagement Scale), consisting of 9 questions graded from 0 (never) to 6 (always), c) the MAOQ (Michigan Organizational Assessment Questionnaire), which measures the intention to quit on a scale from 1 (strongly disagree) to 7 (strongly agree). In some, correlational data analysis was performed (Perera et al., 2022; Toropova et al., 2021). More specifically, they used data from the TIMSS, a large-scale comparative

study, in which 46 countries took part, aiming at cross-referencing data on student proficiency and achievement in mathematics and science. In the work of [Perera et al. \(2022\)](#), data were drawn from two different countries, France (226 teachers) and the Czech Republic (183 teachers). On the contrary, the work of [Toropova et al. \(2021\)](#) focused on 200 teachers from Sweden.

2. Main Discussion

2.1. Purpose of the Current Study

The aim of the current research was to examine the levels of job satisfaction of secondary school science teachers in the prefecture of Attica in the school year, 2022 - 2023. The need to go through the degree of job satisfaction of secondary school science teachers in Greece has become evident through the literature review. Especially since corresponding research, focused on how secondary school science teachers experience job satisfaction, has not yet been carried out in the Greek State.

The research questions are:

1) *What is the level of job satisfaction of secondary school science teachers in the prefecture of Attica in the school year, 2022 - 2023?*

2) *What is the effect of the demographic and work-related parameters (leadership, relationships with colleagues, earnings, workload, performance of students) on the job satisfaction of secondary school science teachers in the prefecture of Attica in the school year, 2022 - 2023?*

2.2. Definitions

The main concepts addressed in this paper are job satisfaction, which is examined through the facets of satisfaction with leadership, relationships with colleagues, workload, salary earnings and student performance. Professional satisfaction is a positive emotional state that derives from the appreciation we have for our work ([Park & Johnson, 2019](#)). In addition, it reflects the positive feelings that arise from the personal evaluation of those work elements which have a positive sign for the individual ([Robbins & Judge, 2007](#)).

Teachers' satisfaction with leadership is defined as the positive inclination resulting from the promotion of a positive climate by the head of school, the stipulation and effective implementation of the teaching program, as well as the supervision of the teaching process ([Gibbs-Harper, 2015](#)). Satisfaction with collegial relationships pertains to the quality of cooperation between the school's teachers, in a way that makes it possible to seek mutually beneficial solutions to common problems during the performance of their duties and priorities ([Armer, 2011](#); [Gibbs-Harper, 2015](#)). Workload satisfaction refers to being content with the time spent preparing the next lesson, for the labs, the grading of the student's papers and their assessment ([Armer, 2011](#); [Toropova et al., 2021](#)). Income satisfaction includes satisfaction with the main salary, the benefits, pension, and any other monetary benefit coming from work ([Miller, 2018](#)). Satisfaction with student performance per-

tains to the comprehension of teaching's content on the students' part, coming up with a solution to a problem on their own, sharpening the related skills (problem solving, logical argumentation, etc.), as well as achieving high performance in science courses (Perera et al., 2022).

3. Methodology

3.1. Research Planning

This research is quantitative and correlational. The quantitative strategy was chosen as job satisfaction is considered a measurable concept (Spector, 1997), thus possible to measure it using Likert scale tools (DeVellis, 2016), directly examining the participants' opinions (Driscoll, 2011), i.e. the secondary school science teachers of the prefecture of Attica. In addition, with quantitative research it is possible to investigate the effect of the independent variables (demographic and professional characteristics) on the dependent ones (job satisfaction factors) using statistical techniques (Muijs, 2011), generalizing the conclusions for a population of similar characteristics (Creswell, 2014). The objectivity and accuracy of the measurements is a necessary condition for the results to be generalizable (Bryman, 2016; Χασάνδρα & Γούδας, 2003). Furthermore, it aims at quantitative or quantifiable data from a sample of numerically determined population, at a specific point in time (2023) and is neither a review of past research nor a continuation of previous research (Cohen et al., 2007; Bryman, 2016).

3.2. Questionnaire

The questionnaire was constructed in Google forms and distributed to science teachers via e-mail (email), social media (Facebook, Instagram, etc.) and mobile phone (sms, viber, etc.). It pertains 2 parts. The first consists of 7 questions, aiming at gathering demographics, such as age, gender, marital status, education level, specialty, teaching experience and working status. In addition, a 26-item 1-5 Likert scale questionnaire (1=Strongly disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly agree) was used for job satisfaction questionnaire originally constructed by the researchers, according to the theoretical framework. The job satisfaction questionnaire includes 6 factors and was tested for reliability using the Cronbach Alpha coefficient, which measures internal consistency reliability with values above 0.6 considered acceptable (Nunnally & Bernstein, 1994), while according to Ouzouni & Nakakis (2011) values over 0.7. The validity of the tool lies in the face, content and conceptual construct validity (McLeod, 2013), which was proved via the Factor analysis technique (Kline, 2014).

A cover letter was attached to the questionnaire, outlining the aim of the research, underlining the participants' anonymity, as well as the importance of their participation, and taking into account all the necessary ethical considerations (APA, 2010). The administering and collection process lasted from the end of March until the middle of April 2023. A deadline of 2 weeks was given for com-

pletion. No special permission was requested from any institution, to the extent that the participation was a matter of personal choice and took place during their free time and not in the context of their duties.

The job satisfaction questions showed high internal correlation ($0.728 > 0.5$). The factor analysis revealed 5 factors which explain 58.52% of the total variation. The 1st factor refers to “Satisfaction with leadership”, includes 5 questions, such as “*The school leadership actively tries to resolve the issues we present*”, interprets 18.23% of the total variance, significance in the interval [0.625, 0.876] and high reliability ($\alpha = 0.880$). The 2nd factor refers to “Satisfaction with salary earnings”, includes 5 questions, such as e.g. “*I am satisfied with my economic progress*”, explains 15.75% of the total variance, has significance in the interval [0.322, 0.750] and high reliability ($\alpha = 0.895$). The 3rd factor refers to “Satisfaction with workload”, includes 5 questions, such as e.g. “*I cope easily with the workload assigned to me*”, responds to 8.72% of the total variance, presents significance in the interval [0.322, 0.750] and acceptable reliability ($\alpha = 0.620$). The 4th factor refers to “Satisfaction with colleagues”, includes 5 questions, such as e.g. “*There is no competition between fellow teachers in the school*”, explains 8.14% of the total variance, significance in the interval [0.412, 0.631] and satisfactory reliability ($\alpha = 0.739$). The 5th factor refers to “Satisfaction with student performance”, includes 5 questions, such as “*I am satisfied with the performance of my students*”, covers 7.67% of the total variance, has significance in the interval [0.366, 0.753] and acceptable reliability ($\alpha = 0.601$) (Table 1). Finally, the question “*I am satisfied with the profession I have chosen*” was used, which applies to the 6th factor “Satisfaction with the profession”.

Table 1. Factor analysis of job satisfaction.

| Questions | Factors (KMO = 0.728, Variance = 58.52%) | | | | |
|---|--|-----------------------------------|----------------------------|------------------------------|---------------------------------------|
| | Satisfaction with leadership | Satisfaction with salary earnings | Satisfaction with workload | Satisfaction with colleagues | Satisfaction with student performance |
| 5. The school leadership actively tries to resolve the issues we present. | 0.876 | | | | |
| 4. My educational initiatives are recognized by the school leadership. | 0.843 | | | | |
| 3. The supervisors at my school contribute effectively to create a climate of cooperation. | 0.825 | | | | |
| 1. The supervisors at my school contribute to the effective management of the curriculum. | 0.819 | | | | |
| 2. I am satisfied with the process of appointing a responsible laboratory implemented by the school leadership. | 0.625 | | | | |
| 18. I am satisfied with my economic development | | 0.867 | | | |
| 16. I am paid enough for the teaching work I offer. | | 0.867 | | | |
| 19. My wages are satisfactory in relation to the country's finances. | | 0.820 | | | |

Continued

| | | | | | |
|--|---------------|---------------|--------------|--------------|---------------|
| 17. I am satisfied with the extra pay I receive when I am assigned overtime. | 0.815 | | | | |
| 20. I expect to receive a satisfactory pension after the end of my teaching career. | 0.709 | | | | |
| 14. I cope easily with the workload assigned to me. | | 0.750 | | | |
| 12. I easily cope with the preparation and teaching of different courses (Physics, Chemistry, Biology, Geology - Geography). | | 0.656 | | | |
| 15. I am satisfied with the time I have available to prepare the next lesson for classroom delivery. | | 0.634 | | | |
| 11. Science teachers are burdened with a greater workload than teachers in other fields [R]. | | -0.465 | | | |
| 13. I spend some time on exam corrections. | | 0.322 | | | |
| 8. There is no competition between fellow teachers in the school | | | 0.631 | | |
| 9. We have a good understanding with our colleagues regarding the sharing of courses and emergency changes to the program. | | | 0.599 | | |
| 7. I would prefer the school climate to be more cooperative [R]. | | | -0.508 | | |
| 10. With colleagues we manage to find mutually beneficial solutions. | | | 0.458 | | |
| 6. Relations with my colleagues are harmonious. | | | 0.412 | | |
| 21. I am satisfied with the performance of my students. | | | | 0.753 | |
| 25. I am satisfied with the students' ability to find solutions to a problem, that I dictate, on their own. | | | | 0.676 | |
| 23. The educational method of teaching helps students to learn and understand the basic principles of natural sciences. | | | | 0.557 | |
| 24. Alternative teaching methods are not needed to improve student performance in science courses. | | | | 0.385 | |
| 22. The equipment of the laboratory is sufficient to improve the knowledge of the students in natural sciences. | | | | 0.366 | |
| Variance (%) | 18.23% | 15.75% | 8.72% | 8.14% | 7.67% |
| Cronbach Alpha | 0.880 | 0.895 | 0.620 | 0.739 | 0.601* |

*Question 23 was not used due to reliability problems.

3.3. Population-Sample

The population of the research is considered to be all secondary school science teachers of the prefecture of Attica in the school year, 2022 - 2023. The sample was collected using the convenient sampling approach (Creswell, 2014) and it consists of 88 teachers, almost equally distributed in terms of gender (47 males and 41 females). The majority is between 41-60 years, married (70.45%, $N = 62$), hold a MSc or PhD, have specialty in Physics (60.22%, $N = 53$), more than 10 years of teaching experience (77.27%, $N = 68$) and are in a steady working status (67.05%, $N = 59$) (Table 2).

Table 2. Demographic characteristics.

| Characteristics | Category | N | % |
|---------------------|-------------|----|-------|
| Age | 25~35 | 6 | 6.82 |
| | 36~40 | 7 | 7.95 |
| | 41~45 | 21 | 23.86 |
| | 46~50 | 19 | 21.59 |
| | 51~60 | 22 | 25.00 |
| | 61~70 | 13 | 14.77 |
| Gender | Male | 47 | 53.41 |
| | Female | 41 | 46.59 |
| Marital status | Single | 16 | 18.18 |
| | Married | 62 | 70.45 |
| Educational level | Divorced | 10 | 11.36 |
| | Bachelor | 35 | 39.77 |
| | MSc | 43 | 48.86 |
| Specialty | PhD | 10 | 11.36 |
| | Physics | 53 | 60.23 |
| | Chemistry | 9 | 10.23 |
| | Biology | 3 | 3.41 |
| | Geology | 10 | 11.36 |
| | Mathematics | 8 | 9.09 |
| | Other | 5 | 5.68 |
| Teaching experience | 1~5 | 12 | 13.64 |
| | 6~10 | 8 | 9.09 |
| | 11~15 | 21 | 23.86 |
| | 16~20 | 14 | 15.91 |
| | 21+ | 33 | 37.50 |
| Working status | Permanent | 59 | 67.05 |
| | Temporary | 29 | 32.95 |

3.4. Data Analysis

Data analysis was performed in IBM SPSS 26. Job satisfaction factors were calculated using the mean of the corresponding questions that presented at least acceptable reliability. Job satisfaction levels were presented with percentages, mean and standard deviation. Hypothesis tests were performed at a 5% significance level. Normality of factors was tested using the Shapiro Wilk test (Razali and Wah, 2011). To compare mean values between 2 independent samples, which are normally distributed, the parametric test and the independent samples t-test were used, while for 3 and more independent samples the parametric test one-way

ANOVA with Post Hoc Analysis LSD. Accordingly, for variables that are not normally distributed, to compare medians between 2 independent samples, the non-parametric test Mann Whitney U was utilized, while for 3 and more independent samples the non-parametric test Kruskal Wallis with Post Hoc Analysis Bonferroni. In parametric tests, data were presented with mean and standard deviation [M (SD)] and in non-parametric with median and interquartile range [Mdn (IR)] (Field, 2017).

4. Results

4.1. Descriptive Statistics

The teachers presented high levels of satisfaction with their profession (70.45%, $M = 3.86$). The satisfaction with the leadership was moderate to high ($M = 3.51$), with the majority stating that the school leadership acknowledges their educational initiatives (62.50%, $M = 3.65$), actively tries to solve their issues (56.82%, $M = 3.55$), foments a cooperative climate (59.09%, $M = 3.63$) and effectively manages the curriculum (54.55%, $M = 3.47$). The satisfaction with colleagues was moderate to high ($M = 3.38$). The relations were considered to be harmonious (82.95%, $M = 4.13$), they manage to come up with mutually beneficial solutions (67.05%, $M = 3.76$) and they have a good understanding in sharing the courses and arranging emergency changes to the daily teaching program (67.04%, $M = 3.70$). Nevertheless, they would prefer the atmosphere at school to be more cooperative (71.59%, $M = 3.93$). The workload satisfaction was moderate ($M = 2.75$) with the science teachers to linger between neutrality (43.18%) and agreement (39.77%), as they stated that they are burdened with a greater effort than the teachers of other fields, while the majority considers the time spent in correcting class tests disproportionately long (65.91%, $M = 2.35$). Students' performance generated satisfaction was moderate to low ($M = 2.43$). Most of the teachers stated that they are not satisfied with the students' ability to find solutions to a problem they are assigned to (56.82%, $M = 2.48$) and that they need alternative teaching methods to improve their overall performance in science courses (84.09%, $M = 1.70$). The teachers were generally dissatisfied with their financial earnings ($M = 1.86$) and especially if compared to the country's economic performance (63.63%, $M = 2.16$), the teaching work they offer (80.68%, $M = 1.78$), the overtime assignments (73.86%, $M = 1.80$) and their financial progress (81.81%, $M = 1.64$) while at the same time they believe that they will not be entitled to a satisfactory pension after the end of their educational career (68.19%, $M = 1.91$) (Table 3).

Table 3. Job satisfaction.

| Questions-Factors | M | SD | DS | D | N | A | AS |
|--|-------------|-------------|-------|--------|--------|--------|--------|
| Satisfaction with leadership | 3.51 | 0.88 | | | | | |
| 4. My educational initiatives are recognized by the school leadership. | 3.65 | 1.05 | 2.27% | 14.77% | 20.45% | 40.91% | 21.59% |

Continued

| | | | | | | | |
|--|-------------|-------------|--------------|---------------|---------------|---------------|---------------|
| 3. The supervisors at my school contribute effectively to create a cooperative climate. | 3.63 | 1.00 | 2.27% | 11.36% | 27.27% | 39.77% | 19.32% |
| 5. The school leadership actively tries to resolve the issues we present. | 3.55 | 0.99 | 2.27% | 13.64% | 27.27% | 40.91% | 15.91% |
| 1. The supervisors at my school contribute to the effective management of the curriculum. | 3.47 | 0.97 | 1.14% | 18.18% | 26.14% | 42.05% | 12.50% |
| 2. I am satisfied with the process of appointing a responsible laboratory implemented by the school leadership. | 3.27 | 1.28 | 10.23% | 19.32% | 25.00% | 23.86% | 21.59% |
| Satisfaction with colleagues | 3.38 | 0.73 | | | | | |
| 6. Relations with my colleagues are harmonious. | 4.13 | 0.80 | 0.00% | 4.55% | 12.50% | 48.86% | 34.09% |
| 7. I would prefer the school climate to be more cooperative [R]. | 3.93 | 1.11 | 2.27% | 12.50% | 13.64% | 32.95% | 38.64% |
| 10. With colleagues we manage to find mutually beneficial solutions. | 3.76 | 0.98 | 2.27% | 9.09% | 21.59% | 44.32% | 22.73% |
| 9. We have a good understanding with our colleagues regarding the sharing of courses and emergency changes to the program. | 3.70 | 1.08 | 3.41% | 13.64% | 15.91% | 43.18% | 23.86% |
| 8. There is no competition between fellow teachers in the school | 3.24 | 1.20 | 7.95% | 21.59% | 26.14% | 27.27% | 17.05% |
| Satisfaction with workload | 2.75 | 0.66 | | | | | |
| 11. Science teachers are burdened with a greater workload than teachers in other fields [R]. | 3.40 | 1.00 | 1.14% | 15.91% | 43.18% | 21.59% | 18.18% |
| 12. I easily cope with the preparation and teaching of different courses (Physics, Chemistry, Biology, Geology - Geography). | 3.02 | 1.20 | 10.23% | 28.41% | 21.59% | 28.41% | 11.36% |
| 14. I cope easily with the workload assigned to me. | 2.95 | 0.97 | 5.68% | 27.27% | 37.50% | 25.00% | 4.55% |
| 15. I am satisfied with the time I have available to prepare the next lesson for classroom delivery. | 2.83 | 1.01 | 5.68% | 39.77% | 23.86% | 27.27% | 3.41% |
| 13. I spend some time on exam corrections. | 2.35 | 1.01 | 17.05% | 48.86% | 19.32% | 11.36% | 3.41% |
| Satisfaction with salary earnings | 1.86 | 0.88 | | | | | |
| 19. My wages are satisfactory in relation to the country's finances. | 2.16 | 1.10 | 36.36% | 27.27% | 21.59% | 13.64% | 1.14% |
| 20. I expect to receive a satisfactory pension after the end of my teaching career. | 1.91 | 1.10 | 51.14% | 17.05% | 25.00% | 3.41% | 3.41% |
| 17. I am satisfied with the extra pay I receive when I am assigned overtime. | 1.80 | 1.12 | 57.95% | 15.91% | 19.32% | 2.27% | 4.55% |
| 16. I am paid enough for the teaching work I offer. | 1.78 | 0.98 | 50.00% | 30.68% | 11.36% | 6.82% | 1.14% |
| 18. I am satisfied with my economic development. | 1.64 | 0.94 | 61.36% | 20.45% | 11.36% | 6.82% | 0.00% |
| Satisfaction with student performance | 2.43 | 0.65 | | | | | |
| 23. The educational method of teaching helps students to learn and understand the basic principles of natural sciences. | 2.98 | 0.97 | 6.82% | 25.00% | 34.09% | 31.82% | 2.27% |
| 21. I am satisfied with the performance of my students. | 2.81 | 0.93 | 5.68% | 34.09% | 37.50% | 19.32% | 3.41% |
| 22. The equipment of the laboratory is sufficient to improve the knowledge of the students in natural sciences. | 2.75 | 1.17 | 18.18% | 23.86% | 27.27% | 26.14% | 4.55% |
| 25. I am satisfied with the students' ability to find solutions to a problem, that I dictate, on their own. | 2.48 | 0.87 | 10.23% | 46.59% | 28.41% | 14.77% | 0.00% |
| 24. Alternative teaching methods are not needed to improve student performance in science courses. | 1.70 | 0.85 | 50.00% | 34.09% | 11.36% | 4.55% | 0.00% |
| Satisfaction with the profession | 3.86 | 1.24 | 6.82% | 10.23% | 12.50% | 30.68% | 39.77% |

DS = Disagree Strongly, D = Disagree, N = Not sure, A = Agree, AS = Agree Strongly.

4.2. Inferential Statistics (Tables 4-11)

The hypothesis of normality was accepted for satisfaction with colleagues ($p = 0.348$), workload ($p = 0.348$) and student performance ($p = 0.060$) while it was rejected for satisfaction with the profession ($p < 0.001$), leadership ($p = 0.028$) and salary earnings ($p < 0.001$) (Table 4). Job satisfaction was found higher for teachers 25 - 35 years old (5.00) than those between 36 - 50 (4.00, $p = 0.041$). Satisfaction with leadership was lower for teachers 36 - 50 years old (3.40) than 51 - 70 (3.80, $p = 0.024$) and 25 - 35 (4.20, $p = 0.026$). Satisfaction with colleagues was lower for teachers 36 - 50 years old (3.20) in comparison to 51 - 70 (3.59, $p = 0.017$) (Table 5). Salary satisfaction was

Table 4. Normality test.

| Factors | W (88) | p-value |
|---------------------------------------|--------|---------|
| Satisfaction with the profession | 0.816 | <0.001 |
| Satisfaction with leadership | 0.968 | 0.028 |
| Satisfaction with colleagues | 0.984 | 0.348 |
| Satisfaction with workload | 0.986 | 0.438 |
| Satisfaction with salary earnings | 0.872 | <0.001 |
| Satisfaction with student performance | 0.973 | 0.060 |

Table 5. Comparisons of factors within age.

| Factors | Age | N | Value | Statistic | p-value |
|---------------------------------------|-------|----|-------------|------------------|---------|
| Satisfaction with the profession | 25~35 | 6 | 5.00 (1.00) | H(2) = 6.105 | 0.047 |
| | 36~50 | 47 | 4.00 (2.00) | | |
| | 51~70 | 35 | 4.00 (1.00) | | |
| Satisfaction with leadership | 25~35 | 6 | 4.20 (0.75) | H (2) = 8.274 | 0.016 |
| | 36~50 | 47 | 3.40 (1.40) | | |
| | 51~70 | 35 | 3.80 (1.20) | | |
| Satisfaction with salary earnings | 25~35 | 6 | 2.60 (2.60) | H (2) = 3.770 | 0.152 |
| | 36~50 | 47 | 1.60 (1.60) | | |
| | 51~70 | 35 | 1.40 (0.80) | | |
| Satisfaction with colleagues | 25~35 | 6 | 3.57 (0.45) | F (2,85) = 3.200 | 0.046 |
| | 36~50 | 47 | 3.20 (0.71) | | |
| | 51~70 | 35 | 3.59 (0.75) | | |
| Satisfaction with workload | 25~35 | 6 | 3.00 (0.84) | F (2,85) = 0.552 | 0.578 |
| | 36~50 | 47 | 2.71 (0.63) | | |
| | 51~70 | 35 | 2.77 (0.67) | | |
| Satisfaction with student performance | 25~35 | 6 | 2.83 (1.04) | F (2,85) = 1.324 | 0.271 |
| | 36~50 | 47 | 2.38 (0.68) | | |
| | 51~70 | 35 | 2.44 (0.52) | | |

higher for women (1.80) than men (1.20, $p = 0.033$) (Table 6), for singles (2.30) than married (1.40, $p = 0.010$) (Table 7) and for temporary teachers (2.00) than the permanent ones (1.40, $p = 0.031$) (Table 11). PhD holders presented lower levels of satisfaction with leadership (2.60) than teachers of a diploma or master degree (3.70, $p = 0.023$) (Table 8).

Table 6. Comparisons of factors within gender.

| Factors | Gender | N | Value | Statistic | p-value |
|---------------------------------------|--------|----|-------------|----------------|--------------|
| Satisfaction with the profession | Male | 47 | 4.00 (2.00) | U = 831.500 | 0.246 |
| | Female | 41 | 4.00 (1.50) | | |
| Satisfaction with leadership | Male | 47 | 3.40 (1.20) | U = 809.000 | 0.195 |
| | Female | 41 | 3.80 (1.30) | | |
| Satisfaction with salary earnings | Male | 47 | 1.20 (1.20) | U = 710.500 | 0.033 |
| | Female | 41 | 1.80 (1.30) | | |
| Satisfaction with colleagues | Male | 47 | 3.34 (0.69) | t(86) = -0.535 | 0.594 |
| | Female | 41 | 3.42 (0.79) | | |
| Satisfaction with workload | Male | 47 | 2.71 (0.70) | t(86) = -0.701 | 0.485 |
| | Female | 41 | 2.80 (0.61) | | |
| Satisfaction with student performance | Male | 47 | 2.44 (0.62) | t(86) = 0.023 | 0.982 |
| | Female | 41 | 2.43 (0.69) | | |

Table 7. Comparisons of factors within marital status.

| Factors | Marital Status | N | Value | Statistic | p-value |
|-----------------------------------|----------------|----|-------------|------------------|--------------|
| Satisfaction with the profession | Single | 16 | 4.00 (1.00) | H (2) = 0.374 | 0.829 |
| | Married | 62 | 4.00 (2.00) | | |
| | Divorced | 10 | 4.00 (1.25) | | |
| Satisfaction with leadership | Single | 16 | 3.70 (1.00) | H (2) = 1.487 | 0.475 |
| | Married | 62 | 3.60 (1.45) | | |
| | Divorced | 10 | 4.00 (1.40) | | |
| Satisfaction with salary earnings | Single | 16 | 2.30 (1.55) | H (2) = 6.687 | 0.035 |
| | Married | 62 | 1.40 (1.20) | | |
| | Divorced | 10 | 1.40 (1.40) | | |
| Satisfaction with colleagues | Single | 16 | 3.33 (0.70) | F (2,85) = 0.834 | 0.438 |
| | Married | 62 | 3.35 (0.76) | | |
| | Divorced | 10 | 3.66 (0.61) | | |
| Satisfaction with workload | Single | 16 | 2.91 (0.72) | F (2,85) = 0.858 | 0.428 |
| | Married | 62 | 2.69 (0.67) | | |
| | Divorced | 10 | 2.86 (0.41) | | |

Continued

| | | | | | |
|---------------------------------------|----------|----|-------------|------------------|-------|
| Satisfaction with student performance | Single | 16 | 2.30 (0.70) | F (2,85) = 1.080 | 0.344 |
| | Married | 62 | 2.50 (0.64) | | |
| | Divorced | 10 | 2.25 (0.60) | | |

Table 8. Comparisons of factors within educational level.

| Factors | Educational level | N | Value | Statistic | p-value |
|---------------------------------------|-------------------|----|-------------|----------------|--------------|
| Satisfaction with the profession | Bachelor-MSc | 78 | 4.00 (2.00) | U = 371.000 | 0.793 |
| | PhD | 10 | 4.00 (2.00) | | |
| Satisfaction with leadership | Bachelor-MSc | 78 | 3.70 (1.20) | U = 217.000 | 0.023 |
| | PhD | 10 | 2.60 (1.45) | | |
| Satisfaction with salary earnings | Bachelor-MSc | 78 | 1.60 (1.40) | U = 366.000 | 0.750 |
| | PhD | 10 | 1.40 (1.05) | | |
| Satisfaction with colleagues | Bachelor-MSc | 78 | 3.41 (0.72) | t (86) = 1.196 | 0.235 |
| | PhD | 10 | 3.12 (0.83) | | |
| Satisfaction with workload | Bachelor-MSc | 78 | 2.76 (0.67) | t (86) = 0.470 | 0.639 |
| | PhD | 10 | 2.66 (0.53) | | |
| Satisfaction with student performance | Bachelor-MSc | 78 | 2.46 (0.67) | t (86) = 0.955 | 0.342 |
| | PhD | 10 | 2.25 (0.39) | | |

Table 9. Comparisons of factors within specialty.

| Factors | Specialty | N | Value | Statistic | p-value |
|-----------------------------------|-------------|----|-------------|---------------|---------|
| Satisfaction with the profession | Physics | 53 | 4.00 (2.00) | H (5) = 1.127 | 0.952 |
| | Chemistry | 9 | 4.00 (2.50) | | |
| | Biology | 3 | 4.00 (0.00) | | |
| | Geology | 10 | 4.00 (1.00) | | |
| | Mathematics | 8 | 5.00 (2.75) | | |
| | Other | 5 | 4.00 (3.00) | | |
| Satisfaction with leadership | Physics | 53 | 3.60 (1.20) | H (5) = 7.754 | 0.170 |
| | Chemistry | 9 | 2.60 (1.50) | | |
| | Biology | 3 | 3.00 (0.00) | | |
| | Geology | 10 | 3.80 (2.15) | | |
| | Mathematics | 8 | 4.00 (1.40) | | |
| | Other | 5 | 4.00 (1.20) | | |
| Satisfaction with salary earnings | Physics | 53 | 1.60 (1.50) | H (5) = 0.816 | 0.976 |
| | Chemistry | 9 | 1.40 (1.80) | | |
| | Biology | 3 | 1.60 (0.00) | | |
| | Geology | 10 | 1.30 (1.70) | | |

Continued

| | | | | | |
|---------------------------------------|-------------|----|-------------|------------------|-------|
| Satisfaction with colleagues | Mathematics | 8 | 1.40 (1.15) | F (5,82) = 0.342 | 0.886 |
| | Other | 5 | 2.00 (0.90) | | |
| | Physics | 53 | 3.36 (0.72) | | |
| | Chemistry | 9 | 3.27 (0.48) | | |
| | Biology | 3 | 3.33 (0.31) | | |
| | Geology | 10 | 3.42 (0.85) | | |
| Satisfaction with workload | Mathematics | 8 | 3.68 (0.91) | F (5,82) = 1.047 | 0.396 |
| | Other | 5 | 3.24 (0.98) | | |
| | Physics | 53 | 2.70 (0.68) | | |
| | Chemistry | 9 | 2.64 (0.47) | | |
| | Biology | 3 | 3.47 (0.31) | | |
| | Geology | 10 | 2.90 (0.73) | | |
| Satisfaction with student performance | Mathematics | 8 | 2.88 (0.71) | F (5,82) = 1.442 | 0.218 |
| | Other | 5 | 2.60 (0.49) | | |
| | Physics | 53 | 2.47 (0.68) | | |
| | Chemistry | 9 | 2.72 (0.61) | | |
| | Biology | 3 | 2.75 (0.50) | | |
| | Geology | 10 | 2.03 (0.52) | | |
| | Mathematics | 8 | 2.28 (0.59) | | |
| | Other | 5 | 2.45 (0.51) | | |

Table 10. Comparisons of factors within teaching experience.

| Factors | Teaching experience | N | Value | Statistic | p-value |
|-----------------------------------|---------------------|----|-------------|---------------|---------|
| Satisfaction with the profession | 1~5 | 12 | 4.00 (1.00) | H (4) = 4.554 | 0.336 |
| | 6~10 | 8 | 3.50 (1.75) | | |
| | 11~15 | 21 | 4.00 (2.50) | | |
| | 16~20 | 14 | 4.00 (1.50) | | |
| | 21+ | 33 | 5.00 (1.00) | | |
| Satisfaction with leadership | 1~5 | 12 | 3.70 (1.05) | H (4) = 5.753 | 0.218 |
| | 6~10 | 8 | 2.70 (1.35) | | |
| | 11~15 | 21 | 3.40 (1.30) | | |
| | 16~20 | 14 | 3.80 (1.60) | | |
| | 21+ | 33 | 3.80 (1.20) | | |
| Satisfaction with salary earnings | 1~5 | 12 | 2.20 (1.75) | H (4) = 4.043 | 0.400 |
| | 6~10 | 8 | 1.60 (1.40) | | |
| | 11~15 | 21 | 1.60 (1.40) | | |
| | 16~20 | 14 | 1.40 (0.85) | | |

Continued

| | | | | | |
|---------------------------------------|-------|----|-------------|------------------|-------|
| | 21+ | 33 | 1.60 (1.40) | | |
| Satisfaction with colleagues | 1~5 | 12 | 3.55 (0.71) | F (4,83) = 0.320 | 0.864 |
| | 6~10 | 8 | 3.38 (0.70) | | |
| | 11~15 | 21 | 3.29 (0.89) | | |
| | 16~20 | 14 | 3.29 (0.51) | | |
| Satisfaction with workload | 21+ | 33 | 3.42 (0.74) | F (4,83) = 0.633 | 0.641 |
| | 1~5 | 12 | 2.95 (0.57) | | |
| | 6~10 | 8 | 2.73 (0.68) | | |
| | 11~15 | 21 | 2.66 (0.73) | | |
| Satisfaction with student performance | 16~20 | 14 | 2.60 (0.66) | F (4,83) = 0.796 | 0.531 |
| | 21+ | 33 | 2.81 (0.64) | | |
| | 1~5 | 12 | 2.38 (0.77) | | |
| | 6~10 | 8 | 2.28 (0.75) | | |
| | 11~15 | 21 | 2.30 (0.44) | | |
| | 16~20 | 14 | 2.43 (0.61) | | |
| | 21+ | 33 | 2.58 (0.71) | | |

Table 11. Comparisons of factors within working status.

| Factors | Working status | N | Value | Statistic | p-value |
|---------------------------------------|----------------|----|-------------|-----------------|--------------|
| Satisfaction with the profession | Permanent | 59 | 4.00 (2.00) | U = 741.500 | 0.287 |
| | Temporary | 29 | 4.00 (2.00) | | |
| Satisfaction with leadership | Permanent | 59 | 3.80 (1.40) | U = 664.000 | 0.088 |
| | Temporary | 29 | 3.40 (1.50) | | |
| Satisfaction with salary earnings | Permanent | 59 | 1.40 (1.20) | U = 614.500 | 0.031 |
| | Temporary | 29 | 2.00 (1.80) | | |
| Satisfaction with colleagues | Permanent | 59 | 3.41 (0.71) | t (86) = 0.496 | 0.621 |
| | Temporary | 29 | 3.32 (0.78) | | |
| Satisfaction with workload | Permanent | 59 | 2.72 (0.63) | t (86) = -0.615 | 0.540 |
| | Temporary | 29 | 2.81 (0.70) | | |
| Satisfaction with student performance | Permanent | 59 | 2.43 (0.66) | t (86) = -0.050 | 0.960 |
| | Temporary | 29 | 2.44 (0.64) | | |

5. Discussion

The current research examined the levels of job satisfaction of secondary school science teachers in the prefecture of Attica in the school year, 2022 - 2023 in relation to certain factors. Satisfaction with the nature of the profession was high for 70.45%, which is in agreement with the findings of Bozeman et al. (2013), where the corresponding percentage was 90%. Levels of satisfaction toward leadership

were found to be moderate to high. Slightly more than half reported that the leadership actively tries to resolve the issues presented to them (56.82%) and recognizes the educational initiatives taken by the teachers (62.50%). In addition, the supervisors at their school contribute effectively to forming a cooperative climate (59.09%) and to effectively manage the curriculum (54.55%). The results are in agreement with the study of Hean & Garrett (2001) which examined the factors influencing job satisfaction among science teachers in Chile regarding leadership, as well as the study of Bozeman et al. (2013) reporting that 60% of teachers are satisfied with the supporting conditions of school leadership.

The vast majority of teachers (more than 67%) reported that the relations with the colleagues are harmonious, but not cooperative to the desired degree. Bozeman et al. (2013) reported that secondary science teachers are satisfied with their relationships with their colleagues, which is due to the interpersonal relationships they have developed (also Toropova et al., 2021). However, Den Brok et al. (2010) reported that science teachers perceived their level of cooperation to be lower compared to teachers of other specialties. In addition, they stated that the working environment could be more cooperative. The relation between job satisfaction and workload was moderate, considering that the main complaints related to the amount of time it takes teachers to correct tests (65.91%) and the heavier workload than teachers in other fields (39.77%), such as administrative duties and excessive meetings (Song & Mustafa, 2015), as well as managing the weekly teaching schedule for all teachers. Regarding satisfaction towards students' performance, more than half (56.82%) reported that students find it difficult to solve a given problem on their own, and the vast majority (84.09%) expressed the need to implement alternative teaching methods to improve student performance in science courses.

Low were the levels of satisfaction for the majority (more than 63%) in respect to salary earnings, to the prospect of receiving a satisfactory pension, to overtimes, to the adding value of teaching work and the possibilities of economic development, a finding which is in agreement with the study of Hean & Garrett (2001). Regarding the effect of the demographic and professional profile on job satisfaction, age was found to be of significance, since young teachers aged 25 - 35 years tend to make a more enthusiastic career start, while older, aged 51 - 70, develop better relationships with colleagues and superiors over the years. The study by Luft & Roehrig (2005) found that newly beginning teachers were excited about a range of new experiences. On the other hand, the researches of Van Maele & Van Houtte (2012) and Bozeman et al. (2013) shows that science teachers who carry more years of work on their shoulders exhibit higher levels of satisfaction, due to the stability of their profession. In regard to that specific age group of 25 - 35 years, the higher levels of job satisfaction may be attributed to the specifics of the very process of appointing secondary education teachers in Greece. The process involves a national competition, in which participants undergo an extensive and demanding writing testing. Given that not only is a process quite challenging with

bottleneck success, but it also occurs once in many years, it is highly plausible that the enthusiasm of the freshly succeeded and hired teachers is reflected on higher job satisfaction.

Satisfaction with salary was lower for men, a finding consistent with the [Hean & Garrett \(2001\)](#) study, while inconsistent with the one by [Bolin \(2007\)](#). The question of what makes women happier with their earnings from this line of occupation is not easy to be conclusively answered. According to [Armer \(2011\)](#), gender is not a parameter that affects job satisfaction. Furthermore, [Toropova et al. \(2021\)](#) attributes this diversification in the socially attributed roles of the genders: “they are more accepting of their “traditional” roles of caring, nurturing and educating”, whereas men might feel off context when it comes to pass on knowledge through teaching. At the same time, though, [Toropova et al. \(2021\)](#) doubt that one-dimensional explanation, casting more light on the fact that male teachers in her research found cooperation to be of crucial importance for evaluating their job as satisfactory. To sum up, until now, there is no definite and sufficient interpretation of the variations in the degree of job satisfaction between men and women science teachers.

The findings of the present research regarding the low earnings satisfaction for permanent teachers, married and with PhDs are, however, not aligned with the corresponding findings of [Mocheche et al. \(2018\)](#), [Zimmerman et al. \(1980\)](#), [Mwamwenda \(1997\)](#), [Pérez Fuentes et al. \(2023\)](#) and [Green & Muñoz, \(2016\)](#). That may be attributed to the extended financial crisis of Greece during the previous decade. Due to the convenient sampling, the results refer to a sample with specific characteristics ([Creswell, 2014](#)), i.e., mainly for Physicists of 41 - 60 years old, who taught in the Prefecture of Attica in the period 2022-2023, on a permanent work status, have a master’s degree or a PhD and more than 10 years of work experience. The small sample is a crucial limitation, not allowing for sufficient statistical inference ([Cohen, 1988](#)). Furthermore, profession satisfaction was studied using a single question, which increases the possibility of systematic errors ([Taylor, 1999](#)). Reliability was moderate in the factors of satisfaction with salary earnings and student performance. Future research should aim for a sample of at least 300 teachers, application of stratified sampling in Attica and use of a reliable and valid questionnaire to measure job satisfaction.

6. Conclusion

The secondary school science teachers of the prefecture of Attica in the school year, 2022 - 2023 turned out to be satisfied mainly with the nature of their profession, something which is aligned with other studies ([Armer, 2011](#); [Bozeman et al, 2013](#); [Song & Mustafa, 2015](#)). The same applies with the positive imprint a present and assisting leadership has, as well as the relationships with colleagues ([Toropova et al., 2021](#)). Major issues of concern include low wages (same with [Ingersoll, 2000](#)), as well as the need to implement alternative teaching methods in order to improve student performance in science courses ([Bozeman et al, 2013](#)). Moreover,

the findings showcased the workload as a constant negative factor, as corroborated by other studies (Song & Mustafa, 2015; Skaalvik & Skaalvik, 2011; Toropova et al., 2021). Younger teachers 25 - 35 showed higher degree of satisfaction with the profession something that comes to direct contradiction to previous findings (Toropova et al., 2021), while those between 51 - 70 have developed better relationships with leadership and colleagues. The need for salary increase is higher for men and married.

All in all, the current research is novel in Greece, as far as the secondary education science teachers is concerned. The findings could help a further focus on the subject of job satisfaction of teachers, and more specifically on the steps that could help improving the overall positive impression about their field of work. To that extent, one of the most obvious suggestions is that a considerable amount of extra workload, non-linked to teaching duties, should be lifted from the teachers' shoulders and be appointed to the administrative sector with the hiring of additional personnel. Apart from that, a reduction in teaching hours for teachers who are School Science Laboratory Managers is considered a necessary medium for alleviating the overall workload. To that extent, there should also be an increase in the as to now insufficient funding for science laboratories. The laboratories do not receive government support for consumables and equipment, and as a result they under function. On the other hand, there is an absence of science laboratories in many schools, even private ones. The lack of laboratories degrades the course and the educational experience, leading to reduced professional satisfaction of teachers. One more step would be for the administration to allow the teachers to participate in further updating and training courses through the Natural Sciences Laboratory Centers (NSLCs). Once a week, science teachers should be able to leave after the third two-hour period to participate in training activities, instead of being obliged to offer from their free time, as it is the norm in the current state. Last but not least, it is necessary for the science teachers to acquire through systematic training a deeper and wider know-how in the interpersonal level. That pertains not only to the manner, in which they communicate the complex scientific information to the students in a way that it could be understood and absorbed, but also in the empathy the teacher should show, when students find it difficult to assimilate the novel knowledge. That would improve the overall teaching process and outcome, and in return would increase the teachers' sense of achievement (Den Brok et al., 2010).

Acknowledgements

We would like to express our sincere thanks to all the teachers who generously gave their time and effort to participate in this study. Their valuable contribution to data collection has greatly enriched our research.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- APA (2010). *Ethical Principles of Psychologists and Code of Conduct*. American Psychological Association.
- Armer, T. (2011). *Science Teachers: Factors That Affect Job Satisfaction*. Doctoral Thesis, Capella University Minneapolis.
<https://www.proquest.com/docview/876194755?pq-origsite=summon>
- Bolin, F. (2007). A Study of Teacher Job Satisfaction and Factors That Influence It. *Chinese Education & Society*, 40, 47-64. <https://doi.org/10.2753/ced1061-1932400506>
- Bozeman, T. D., Scogin, S. C., & Stuessy, C. S. (2013). Job Satisfaction of High School Science Teachers: Prevalence and Association with Teacher Retention. *The Electronic Journal of Science Education*, 17, 1-19. <https://files.eric.ed.gov/fulltext/EJ1188384.pdf>
- Bryman, A. (2016). *Social Research Methods*. Oxford University Press.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Erlbaum.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education*. Routledge Falmer.
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). Sage Publications.
- den Brok, P., Taconis, R., & Fisher, D. (2010). How Well Do Science Teachers Do? Differences in Teacher-Student Interpersonal Behavior between Science Teachers of Other (School) Subjects. *The Open Education Journal*, 3, 44-53.
<https://doi.org/10.2174/1874920801003010044>
- DeVellis, R. F. (2016). *Scale Development. Theory and Applications* (4th ed.). Sage Publications.
- Driscoll, D. L. (2011). Introduction to Primary Research: Observations, Surveys, and Interviews. *Writing Spaces: Readings on Writing*, 2, 153-174.
<https://wac.colostate.edu/docs/books/writingspaces2/driscoll--introduction-to-primary-research.pdf>
- Field, A. (2017). *Discovering Statistics Using IBM SPSS* (5th ed.). Sage Publications Ltd.
- Gibbs-Harper, N. (2015). *Principals' Instructional Management Skills and Middle School Science Teacher Job Satisfaction*. Doctoral Thesis, Capella University.
<https://www.proquest.com/pagepdf/1735800988?accountid=8359>
- Green, A. M., & Muñoz, M. A. (2016). Predictors of New Teacher Satisfaction in Urban Schools: Effects of Personal Characteristics, General Job Facets, and Teacher-Specific Job Facets. *Journal of School Leadership*, 26, 92-123.
<https://doi.org/10.1177/105268461602600104>
- Grissom, J. A. (2011). Can Good Principals Keep Teachers in Disadvantaged Schools? Linking Principal Effectiveness to Teacher Satisfaction and Turnover in Hard-to-Staff Environments. *Teachers College Record: The Voice of Scholarship in Education*, 113, 2552-2585. <https://doi.org/10.1177/016146811111301102>
- Hean, S., & Garrett, R. (2001). Sources of Job Satisfaction in Science Secondary School Teachers in Chile. *Compare: A Journal of Comparative and International Education*, 31, 363-379. <https://doi.org/10.1080/03057920120098491>
- Ingersoll, R. M. (2000). *Turnover among Mathematics and Science Teachers in the U.S. Paper Prepared for the National Commission on Mathematics and Science Teaching for the 21st Century*.
http://repository.upenn.edu/cgi/viewcontent.cgi?article=1095&context=gse_pubs&seiredir=1#search=%22ingersoll+%22and%22Turno-

- [ver+among+mathematics+and+science+teachers+in+the+U.S.%22](#)
- Kline, P. (2014). *An Easy Guide to Factor Analysis*. Routledge.
- Luft, J. A., & Roehrig, G. (2005). Enthusiasm Is Not Enough: Beginning Secondary Science Teachers in Primarily Hispanic Settings. *School Science and Mathematics, 105*, 116-126. <https://doi.org/10.1111/j.1949-8594.2005.tb18046.x>
- McLeod, S. A. (2013). *What Is Validity?* Simply Psychology.
- Miller, C. M. (2018). *Factors Affecting Job Satisfaction and Teacher Retention for North Texas Secondary Science Teachers*. Doctoral Thesis, Baptist University. <https://www.proquest.com/docview/2036363771?pq-origsite=gscholar&fromopen-view=true>
- Mocheche, E. K., Raburu, P. A., & Bosire, J. (2018). Is Marital Status a Predictor of Job Satisfaction of Public Secondary School Teachers. *International Journal of Psychology and Behavioral Sciences, 8*, 51-58.
- Muijs, D. (2011). *Doing Quantitative Research in Education with SPSS*. Sage Publications Ltd. <https://doi.org/10.4135/9781849203241>
- Mwamwenda, T. S. (1997). Marital Status and Teachers' Job Satisfaction. *Psychological Reports, 80*, 521-522. <https://doi.org/10.2466/pr0.1997.80.2.521>
- Nunnally, J., & Bernstein, I. (1994). *Psychometric Theory* (3rd ed.). McGraw-Hill, Inc.
- Park, J. Y., Kang, S. H., Hur, M., & Pak, S. J. (1994). A Survey on the Teaching Environments for Secondary School Science Teachers. *Journal of The Korean Association for Science Education, 14*, 366-378.
- Park, K. A., & Johnson, K. R. (2019). Job Satisfaction, Work Engagement, and Turnover Intention of CTE Health Science Teachers. *International Journal for Research in Vocational Education and Training, 6*, 224-242. <https://doi.org/10.13152/ijrvet.6.3.2>
- Perera, H. N., Maghsoudlou, A., Miller, C. J., McIlveen, P., Barber, D., Part, R. et al. (2022). Relations of Science Teaching Self-Efficacy with Instructional Practices, Student Achievement and Support, and Teacher Job Satisfaction. *Contemporary Educational Psychology, 69*, Article ID: 102041. <https://doi.org/10.1016/j.cedpsych.2021.102041>
- Pérez Fuentes, C. A., Alvarez Maestre, A. J., Cardona Rivas, A. M., Aguilar Barreto, A. J., & Sanabria Alarcón, R. K. (2023). Job Satisfaction and Teacher Education: Correlational Study in Postgraduate Graduates in Education. *Education Sciences, 13*, Article No. 198. <https://doi.org/10.3390/educsci13020198>
- Razali, N., & Wah, Y. (2011). Power Comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling Tests. *Journal of Statistical Modeling and Analytics, 2*, 21-33. <https://www.nrc.gov/docs/ML1714/ML17143A100.pdf>
- Robbins, S. P., & Judge, T. A. (2007). *Organizational Behavior* (12th ed.). Pearson Prentice Hall.
- Skaalvik, E. M., & Skaalvik, S. (2011). Teacher Job Satisfaction and Motivation to Leave the Teaching Profession: Relations with School Context, Feeling of Belonging, and Emotional Exhaustion. *Teaching and Teacher Education, 27*, 1029-1038. <https://doi.org/10.1016/j.tate.2011.04.001>
- Song, S., & Mustafa, M. (2015). Factors Impacting on Teachers' Job Satisfaction Related to Science Teaching: A Mixed Methods Study. *Science Education International, 26*, 358-375.
- Spector, P. (1997). *Job Satisfaction: Application, Assessment, Causes, and Consequences*. SAGE Publications, Inc. <https://doi.org/10.4135/9781452231549>
- Taylor, J. R. (1999). *An Introduction to Error Analysis: The Study of Uncertainties in Phys-*

ical Measurements (p. 94). University Science Books.

- Toropova, A., Myrberg, E., & Johansson, S. (2021). Teacher Job Satisfaction: The Importance of School Working Conditions and Teacher Characteristics. *Educational Review*, 73, 71-97. <https://doi.org/10.1080/00131911.2019.1705247>
- Van Maele, D., & Van Houtte, M. (2012). The Role of Teacher and Faculty Trust in Forming Teachers' Job Satisfaction: Do Years of Experience Make a Difference? *Teaching and Teacher Education*, 28, 879-889.
- Zimmerman, K. W., Skinner, D. A., & Birner, R. (1980). Career Involvement and Job Satisfaction as Related to Job Strain and Marital Satisfaction of Teachers and Their Spouses. *Home Economics Research Journal*, 8, 421-427. <https://doi.org/10.1177/1077727x8000800606>
- Ουζούνη, Χ., & Νακάκης, Κ. (2011). Η αξιοπιστία και η εγκυρότητα των εργαλείων μέτρησης σε ποσοτικές μελέτες. *Νοσηλευτική*, 50, 231-239. <https://eclass.uop.gr/modules/document/file.php/TS162/%CE%9A%CE%91%CE%A4%CE%A3%CE%97%CE%A3%CE%B5%CE%B3%CE%BA%CF%85%CF%81%CE%BF%CF%84%CE%B7%CF%84%CE%B1%20%CE%BA%CE%B1%CE%B9%20%CE%B1%CE%BE%CE%B9%CE%BF%CF%80%CE%B9%CF%83%CF%84%CE%AF%CE%B1.pdf>
- Χασάνδρα, Μ., & Γούδας, Μ. (2003). Κριτήρια Εγκυρότητας και Αξιοπιστίας στην Ποιοτική-Ερμηνευτική Έρευνα. Επιστημονική Επετηρίδα της Ψυχολογικής Εταιρείας Βορείου Ελλάδος, (2), 1-48. http://lab.pe.uth.gr/psych/images/stories/pdf/various/kritiria_egyrotitas_kai_aksiopis-tias_stin_poiotiki_ereyna.pdf