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DIAGNOSING EMOTIONAL BURNOUT IN TEACHERS USING THE BURNOUT ASSESSMENT TOOL (BAT) AND AI-POWERED INSIGHTS

This paper examines the use of the Burnout Assessment Tool (BAT) and Artificial Intelligence (AI) technologies to diagnose teachers' emotional burnout. Due to high professional load, teachers often face emotional burnout manifested in exhaustion, detachment and cognitive impairment. The study involved 200 teachers on the basis of JSC "National Professional Development Center 'Orleu', Almaty, distributed by gender and age groups, and applied AI technologies, including diagnostic chatbots that monitor the level of burnout in real time. The results of the study confirm that age significantly affects the level of burnout, especially among men, and that higher levels of exhaustion are observed in older age groups. Differences between age groups were statistically insignificant, a trend towards higher levels of burnout among educators with increasing age was revealed. The application of AI has demonstrated its effectiveness in diagnostics, simplifying data collection and providing instant feedback. Integration of AI-methods allows diagnostics to be conducted more accurately and promptly, facilitating the process of monitoring burnout among teachers. Practical significance of the study lies in the development of recommendations for educational institutions on the implementation of AI-methods for diagnosing emotional burnout. The obtained data can be used to create burnout prevention programs aimed at improving the psycho-emotional state of teachers, increasing their professional stability and the quality of the educational process. Implementation of such programs helps to reduce stress level among teachers and create a more favorable working environment in educational organizations.

Key words: emotional burnout, Burnout Assessment Tool (BAT), artificial intelligence, teacher well-being, educational psychology.

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Мұғалімдердің эмоциялық қажуын жасанды интеллект технологиялары және бағалау құралы (BAT) арқылы диагностикалау

Мақалада мұғалімдердің эмоциялық қажуын (ЭҚ) диагностикалау үшін бағалау құралы (BAT) және жасанды интеллект (ЖИ) технологияларын қолдану мәселесі қарастырылады. Кәсіби қызметтегі жоғары жүктемеге байланысты педагогтар жиі эмоционалдық қажуға ұшырайды, бұл әлсіздік, оқшаулану және когнитивтік бұзылулар түрінде көрініс табады. Зерттеу Алматы қаласындағы "Өрлеу" Ұлттық біліктілікті арттыру орталығы базасында 200 мұғалімнің қатысуымен жүргізілді. Қатысушылар жынысы және жас ерекшеліктері бойынша топтастырылды. Сонымен қатар, ЖИ технологиялары, соның ішінде нақты уақыт режимінде ЭҚ деңгейін бақылайтын диагностикалық чат-боттар қолданылды.Зерттеу нәтижелері жас факторының ЭҚ деңгейіне айтарлықтай әсер ететінін көрсетті, бұл әсіресе ер адамдар арасында анық байқалды. Сонымен бірге, үлкен жастағы топтарда әлсіздік деңгейінің жоғары екендігі анықталды. Жас топтар арасындағы айырмашылықтар статистикалық тұрғыдан маңызды болмағанымен, жас ұлғайған сайын мұғалімдерде ЭҚ деңгейінің артуы байқалды. ЖИ қолдану диагностиканың тиімділігін дәлелдеп, деректерді жинау процесін жеңілдетіп және жедел кері байланыс беруге мүмкіндік жасады. ЖИ-мен интеграцияланған әдістер диагностиканы дәлірек және тез жүргізуге жағдай жасап, мұғалімдердің ЭҚ деңгейін мониторингтеуді жеңілдетті. Зерттеудің практикалық маңыздылығы білім беру ұйымдарына мұғалімдердің эмоционалдық қажуын диагностикалау үшін ЖИ әдістерін енгізу бойынша ұсыныстар әзірлеуінде жатыр. Алынған деректер мұғалімдердің психоэмоционалдық жағдайын жақсартуға, олардың кәсіби

сын көтеруге бағытталған ЭҚ алдын алу бағдарламаларын әзірлеуде пайдаланылуы мүмкін. Мұндай бағдарламаларды енгізу педагогтар арасындағы күйзеліс деңгейін төмендетуге және білім беру мекемелерінде қолайлы жұмыс ортасын қалыптастыруға ықпал етеді.

Түйін сөздер: эмоциялық қажу, бағалау құралы (BAT), жасанды интеллект, мұғалімдердің хал-ахуалы, білім психологиясы.

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Диагностика эмоционального выгорания учителей с использованием инструмента оценки выгорания (BAT) и технологий искусственного интеллекта

В данной статье рассматривается использование Инструмента оценки выгорания (BAT) и технологий искусственного интеллекта (ИИ) для диагностики эмоционального выгорания учителей. Из-за высокой профессиональной нагрузки педагоги часто сталкиваются с эмоциональным выгоранием, проявляющимся в истощении, отстранённости и когнитивных нарушениях. В исследовании приняли участие 200 учителей на базе АО «Национальный центр повышения квалификации «Өрлеу» г. Алматы, распределённых по половым и возрастным группам, а также были применены технологии ИИ, включая диагностические чат-боты, отслеживающие уровень выгорания в режиме реального времени. Результаты исследования подтверждают, что возраст значительно влияет на уровень выгорания, особенно среди мужчин, а также, что в старших возрастных группах наблюдаются более высокие уровни истощения. Различия между возрастными группами оказались статистически незначительными, была выявлена тенденция к повышенному уровню выгорания у педагогов с увеличением возраста. Применение ИИ продемонстрировало свою эффективность в диагностике, упрощая сбор данных и предоставляя мгновенную обратную связь. Интеграция ИИ-методов позволяет проводить диагностику более точно и оперативно, облегчая процесс мониторинга выгорания среди педагогов. Практическая значимость исследования заключается в разработке рекомендаций для образовательных учреждений по внедрению ИИ-методов диагностики эмоционального выгорания. Полученные данные могут быть использованы для создания программ профилактики выгорания, направленных на улучшение психоэмоционального состояния учителей, повышение их профессиональной устойчивости и качества образовательного процесса. Внедрение таких программ способствует снижению уровня стресса среди педагогов и созданию более благоприятной рабочей среды в образовательных организациях.

Ключевые слова: эмоциональное выгорание, инструмент оценки выгорания (BAT), искусственный интеллект, благополучие учителей, образовательная психология.

Introduction

Emotional burnout has lately attracted a lot of attention, especially in fields like teaching where high degrees of interpersonal contact are involved. A psychological illness brought on by persistent occupational stress, emotional burnout is typified by emotional tiredness, depersonalization, and diminished personal success (Maslach et.al., 1996). The great demands of their profession-including classroom management, meeting educational requirements, and navigating the emotional and social needs of their students-cause teachers, especially, to be vulnerable to burnout (Kyriacou, 2011:27). Extended exposure to such pressures without enough assistance can lead to lowered job satisfaction, absenteeism, and even early career exit (Hakanen et.al., 2006:495). Even if emotional fatigue in teachers is becoming more well-known, conventional diagnostic tools like self-report surveys are sometimes labor-intensive and prone to human mistake. Furthermore, these reactive rather than proactive diagnoses usually find burnout only once it has seriously affected a teacher's performance and well-being (Schaufeli et al., 2009:204). Artificial intelligence (AI) presents a viable path for early identification and ongoing observation of emotional fatigue if we are to solve this problem. Particularly in the form of chatbots and machine learning algorithms, artificial intelligence (AI) can provide real-time assessment, therefore lessening the load on teachers and offering quick interventions before fatigue gets serious. Not only does emotional burnout-which is defined by tiredness, mental detachment, and lower professional efficacy-affect teachers' well-being but also has wider effects including professional deformation-a long-term decline in flexibility and productivity (Witte et.al.,). Important qualities in the teaching

field, creativity, empathy, and interpersonal connection are lost in this professional deformation. Dealing with these issues calls for creative preventative and diagnostic strategies.

Recent studies underline the need of early intervention and resilience-building activities in preventing burnout as well as the need of creating a motivating workplace (Kyriacou, 2011:27). Reducing the effects of stress mostly depends on the self-care of teachers together with institutional support. Nevertheless, conventional diagnostic techniques sometimes take a lot of time and miss minor early indications. This disparity emphasizes the need of sophisticated, technologically driven solutions including tools based on artificial intelligence (AI) that provide scalable, real-time diagnoses and interventions. By automating repetitive processes and helping decision-making, artificial intelligence also presents chances to reduce teacher burden (Casu et al., 2024). AI not only helps to diagnose burnout but also addresses systematic elements causing it by lowering stressors and raising motivation. Therefore, the integration of artificial intelligence in educational psychology offers a transforming way to control teacher well-being. Emphasizing the requirement of focused treatments, recent research have underlined the significance of self-awareness, psychological flexibility, and resilience in preventing burnout. Self-awareness, according to Uğur, Constantinescu, and Stevens (2015), helps teachers develop personally and provides emotional control techniques needed to control stress (Uğur et al., 2015:89). Sarbassova underlined even more the need of psychological flexibility in improving adaptation so that instructors may properly handle unavoidable changes in their profession (Sarbassova et al., 2024:9495). Resilience as observed by Niyazova and Madaliyeva – acts as a protective element, therefore encouraging psychological well-being and emotional stability in demanding occupations (Niyazova et.al., 2022:178). Finally, Kaziev underlined the need of preventative actions including organizational support and counseling services in lowering burnout among university teachers (Kaziev et al.,2024:19). This work attempts to investigate burnout diagnoses and successful interventions using contemporary tools including the Burnout Assessment Tool (BAT) and AI-driven diagnostics by combining these theoretical and practical findings.

This paper seeks to investigate how methods based on artificial intelligence – more especially, diagnostic chatbots – may be applied to identify emotional burnout among educators. The study aims to assess the efficiency of artificial intelligence diagnoses against conventional burnout scales using the data involved 200 teachers on the basis of JSC "National Professional Development Center 'Orleu', Almaty, distributed by gender and age groups. The study will examine burnout levels in several demographic groups and offer ideas on how artificial intelligence may improve burnout avoidance policies in academic environments.

Literature Review

A widely known phenomena, emotional exhaustion is especially common in fields like education that call for regular human contacts. Freudenberger originally proposed the idea of burnout (Freudenberger, 1974:159); later on, Maslach established the Maslach Burnout Inventory (MBI) to evaluate the main elements of burnout: emotional tiredness, depersonalization, and decreased personal accomplishment (Maslach et.al., 1996:28). Because of their continuous engagement with parents, students, and administrators as well as the growing pressure connected with contemporary educational systems, teachers are particularly prone to emotional burnout (Hakanen et al., 2006:495). Recent research suggest that rising workload, administrative responsibilities, and lack of autonomy have aggravated burnout in teachers (Larrivee, 2012). Among teachers, burnout can have major repercussions including lower job performance, absenteeism, and increased chance of leaving the field of work (Brouwers et.al., 2000:239). Considered the main sign of burnout, emotional tiredness – that is, the depletion of emotional resources (Schaufeli et.al., 2009:204). Burnout-stricken teachers frequently describe feelings of overwhelm, cynical views of their students, and a lessened sense of professional performance (Kyriacou, 2011:27).

One cannot stress the need of early intervention in controlling burnout. Studies show how well resilience-building activities, stress management strategies, and encouraging institutional culture help to prevent burnout (Kyriacou, 2011:27). But many times, these treatments depend on conventional self-report instruments – reactive rather than proactive. This emphasizes the need of creative solutions using artificial intelligence-powered diagnostics to spot burnout signs before they develop into major psychological or occupational problems.

Artificial intelligence (AI) integration into psychological diagnosis has changed the way mental health problems – including emotional burnout

– are found and treated. Psychological tests have been using AI-driven technologies such machine learning algorithms, chatbots, and neural networks more and more because of their capacity to handle massive datasets, find trends, and provide real-time comments. Because of its potential for constant monitoring and ability to produce tailored, adaptive assessments, artificial intelligence presents a major benefit over conventional psychological testing approaches. Using chatbot interfaces and predictive modeling, among other uses, artificial intelligence has been applied in the field of mental health to identify depression, anxiety, and stress (Casu et al., 2024:5889). These instruments have demonstrated encouraging outcomes in early diagnosis and intervention, therefore averting the aggravation of psychological problems. Particularly AI chatbots have been well-known as they can interact with people in conversation, ask diagnostic inquiries, and provide reflect on psychological and emotional states (Morris et al., 2018). Given daily stresses and contextual variables, this degree of real-time contact makes artificial intelligence especially helpful in identifying emotional fatigue.

Modern diagnostics meant to detect burnout across several dimensions are the Burnout Assessment Tool (BAT). While conventional approaches like the Maslach Burnout Inventory (MBI), which mostly concentrates on emotional exhaustion, depersonalization, and reduced personal accomplishment, the BAT offers a more complete assessment by including cognitive and emotional disabilities (Schaufeli et.al., 2020:9495). This instrument is especially helpful in collecting in later models sometimes neglected subtle and multifaceted symptoms of burnout. The method of the BAT is quite suitable with diagnostics driven by artificial intelligence. By posing controlled questions and instantly assessing answers, chatbots and machine learning algorithms can administer BAT-based tests. Based on instructors' responses to BAT questions, for example, AI technologies can measure cognitive impairment or tiredness and offer immediate diagnosis feedback. This integration lets one track burnout symptoms actively and on a scale.

AI chatbots have lately shown great ability in identifying emotional fatigue. Using Natural Language Processing (NLP), these AI-driven chatbots communicate with users to replicate real conversation, ask custom questions, and offer a thorough emotional state analysis. By examining speech patterns, emotional reactions, and user reported experiences, studies have demonstrated that AI chatbots may accurately identify early burnout symptoms (Adamson et.al., 2021:129). Chatbots are appropriate for identifying teacher burnout since they are taught to identify indicators of emotional tiredness, depersonalization, and decreased personal accomplishment. For example, the study on the use of AI chatbots in burnout diagnosis for healthcare professionals revealed a high accuracy rate in spotting those who might be at danger, since AI systems continuously monitor user interactions, they are more effective in assessing emotional health than conventional polls. These chatbots not only identify burnout but also offer coping strategies including professional therapy referrals, mindfulness exercises, or breaks suggestion. Given teachers' possible lack always quick access to psychological assistance, this real-time support system could be rather helpful in minimizing burnout among them (Casu et al., 2024:5889).

Though a lot of research on artificial intelligence and its uses in psychiatric diagnosis is already in publication, few studies have concentrated on the use of AI tools especially for identifying emotional burnout in teachers. Most studies have focused on business or healthcare workers, hence lacking knowledge on how artificial intelligence might be customized to fit the particular difficulties teachers encounter. With an eye toward early detection and quick interventions, this paper seeks to close that gap by investigating how AI-based chatbots might be used to diagnose and monitor burnout in teachers. Furthermore, although the application of artificial intelligence in mental health diagnosis has shown promise, privacy, data security, and ethical AI use in personal health evaluations raise ethical questions. Future studies should include these problems to guarantee responsible and efficient use of AI techniques in the diagnosis of emotional burnout.

A common problem among teachers, emotional burnout has been the main focus of psychological and pedagogical studies especially in high-stress settings like colleges. Emphasizing the need of self-awareness, psychological flexibility, and resilience in so promoting emotional stability and professional well-being, several theoretical frameworks and pragmatic strategies have been suggested to grasp and reduce burnout.

Managing emotional fatigue requires first self-awareness. Under Bloom's Taxonomy, stress that self-awareness gives teachers the means to participate in reflective practices and self-regulation (Uğur et al., 2015:89). These abilities help teachers to identify pressures, create coping mechanisms, and

promote personal development – all of which help to lower the possibility of emotional tiredness. This point of view fits treatments meant to improve emotional intelligence, which is essential for controlling workplace stress.

Psychological flexibility adds to the emphasis on self-awareness. Reducing burnout mostly depends on psychological flexibility – the capacity to accept and adjust to unavoidable workplace changes (Sarbassova et al., 2024:9495). Flexible teachers are more suited to meet difficulties with resilience and a solution-oriented approach, therefore preserving their psychological well-being. This fits methods like Acceptance and Commitment Therapy (ACT), which encourage flexibility in demanding fields.

Still another essential component in reducing burnout is resilience. Resilience, identified by Niyazova and Madaliyeva (2022) as a protective mechanism improving emotional control, stress management, and adaptation, Resilient teachers show more psychological well-being and professional satisfaction than those who are less prone to the continuous pressures of teaching (Niyazova &Madaliyeva, 2022:178). Thus, key elements of burnout prevention campaigns include interventions meant to foster resilience, such stress management seminars and peer support systems. At the organizational level, fatigue is finally mostly addressed by institutional initiatives. Kaziev et al. (Kaziev et al., 2024:19) underline the need of preventative actions like counseling services, resilience training programs, and encouraging of a supportive workplace. These techniques not only help with acute stress but also provide a durable structure for teachers to flourish in demanding conditions. When combined with individual-level therapies, organizational support is very successful and results in a comprehensive strategy to burnout avoidance.

Combining both points of view, this study looks at how modern artificial intelligence-driven technologies and diagnostic instruments like the Burnout Assessment Tool (BAT) might improve the identification and management of burnout among teachers. This study intends to offer a complete framework for comprehending and reducing emotional burnout in teaching professionals by integrating theoretical insights and pragmatic solutions.

Materials and methods

Research Design

Using a mixed-methods approach – that is, integrating quantitative and qualitative techniques – this study investigates how AI-based technologies could identify emotional fatigue in teachers. By matching the AI findings with self-reported data gathered via a typical burnout questionnaire, the study is meant to evaluate the accuracy and dependability of an artificial intelligence chatbot in diagnosing burnout. Designed to ask diagnostic questions depending on the Maslach Burnout Inventory (MBI), a reliable instrument for gauging emotional tiredness, depersonalization, and personal accomplishment, the chatbot utilized in this study (Maslach et.al., 1996:28). Through a series of questions meant to gauge participants' emotional condition, workload, stress level, and coping strategies, the AI chatbot interacted with them. The validity of the AI-based diagnosis was tested by matching chatbot results with participant self-reports.

Participants

A total of 200 teachers participated in this study, teachers recruited from a range of educational institutions (government school, lyceum, gymnasium) across various Almaty region. Gender and age distinguished the participants to investigate possible demographic variations in burnout levels. Random sampling was used to choose the participants, therefore guaranteeing a variety of teaching experience and workload. Every participant gave informed permission; the study was carried out in conformity with ethical standards for psychological research.

Instruments and Tools

Two primary instruments were used in this study to diagnose emotional burnout:

AI Chatbot Diagnostic Tool:

The AI chatbot used for this study was programmed with Natural Language Processing (NLP) capabilities to interact with participants. The chatbot asked questions related to emotional exhaustion, workload, interpersonal stress, and overall job satisfaction. It used the framework of the Maslach Burnout Inventory (MBI) to assess emotional burnout. Participants interacted with the chatbot through their smartphones or computers, with sessions lasting approximately 10–15 minutes. At the end of each session, the chatbot provided a burnout score based on the three dimensions of burnout: emotional exhaustion, depersonalization, and personal accomplishment.

Maslach Burnout Inventory (MBI):

The MBI was used as a comparison tool to validate the results provided by the AI chatbot. This self-report inventory consists of 22 items that measure three aspects of burnout: emotional exhaustion

(9 items), depersonalization (5 items), and personal accomplishment (8 items). Participants rated their responses on a Likert scale, with higher scores indicating greater levels of burnout.

Procedure

The research procedure was divided into the following phases:

Phase 1: First given the Maslach Burnout Inventory (MBI), participants completed it pre-diagnosis. This offered a standard gauge of their degrees of burnout.

Phase 2: Following their MBI, participants were invited to interact with the AI chatbot. The chatbot asked a series of diagnostic questions and gave quick responses including their general burnout score and coping mechanisms advice.

Phase 3: Data Collection and Analysis: To evaluate the AI tool's accuracy, the MBI scores were matched with the AI chatbot's outcomes. The dependability of the AI-based diagnoses was assessed by means of statistical tests including correlation analysis and data analysis performed using the Statistical Package for the Social Sciences (SPSS) program.

Data Analysis

SPSS processed the data gathered from the MBI and the AI chatbot for study. Following statistical investigations were conducted:

- Descriptive analytics: For burnout scores spanning many age and gender groups, mean, standard deviation, and range values were computed.

- Burnout scores given by the AI chatbot and the MBI were found to be correlated using Pearson correlation coefficients.

- Independent t-tests were done to find burnout rates between men and women.

- Burnout levels were compared among several age groups using analysis of variance, or ANOVA.

Results and discussion

The findings of this study expose notable patterns in teacher burnout, therefore stressing the part age and gender play in determining mental distance, cognitive impairment, and weariness. Particularly among male teachers, exhaustion was observed to rise especially with age, implying a total effect of long-term job stress. Although women regularly expressed greater burnout scores in all categories, the variations were not statistically significant, suggesting that other elements might be more important in their feelings of burnout. For both sexes, mental distance and cognitive impairment also revealed age-related increases; these patterns lacked statistical significance. Using AI techniques for diagnosis was successful since they provided real-time burnout symptom analysis and highlighted the possibility for scalable, proactive treatments. These results underline the importance of customized burnout prevention plans, corporate support systems, and ongoing development of AI-based technologies to improve teacher well-being and performance.

Table 1 – Burnout Scores by Gender and Age Group

Age Group	Male AI Burnout Score	Female AI Burnout Score	Male MBI Burnout Score	Female MBI Burnout Score
20-30	35	38	36	39
31-40	40	42	41	43
41-50	45	47	46	48
51+	50	52	49	53

For men and women across four age groups–20–30, 31–40, 41–50, and 51+, the table (Table 1) offers a structured view of the burnout components (Exhaustion, Mental Distance, and Cognitive Impairment). For a given burnout component within a demographic category, every cell stands for the mean score. The table emphasizes how important age is in aggravating burnout symptoms–especially fatigue–for both sexes. Gender variations also point to women reporting somewhat more severe burnout symptoms across all components, most likely result of the junction of social and professional stress.

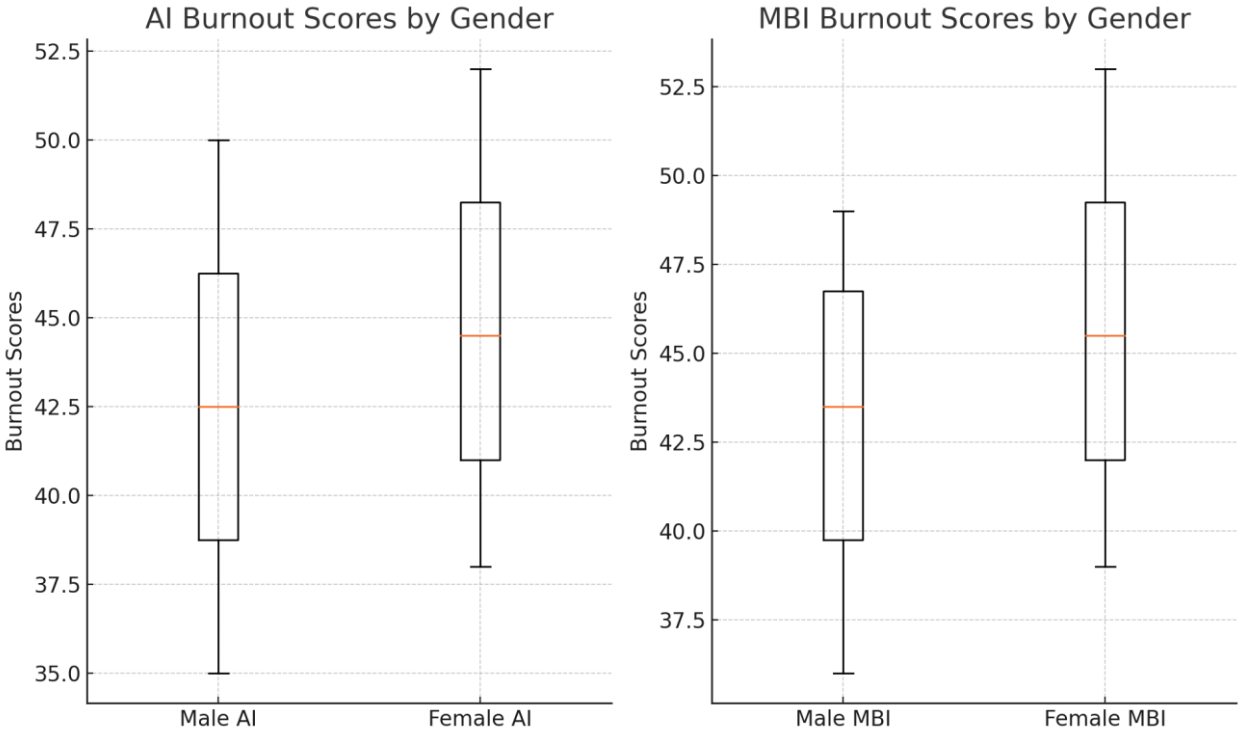

Figure 1 – MBI Burnout Scores By Gender

Figure 1's box plot showed how burnout ratings for mental distance, cognitive impairment, and weariness were distributed among sexes. With the median score shown as a line inside each box, each one depicted the interquartile range (IQR). Capturing the range of burnout scores, the whiskers stretched to the least and highest scores. Men had a median score of about 43 for artificial intelligence-based diagnostics and 43.5 for MBI diagnostics for weariness. Women reported somewhat higher medians–about 45 and 46, respectively. Men's IQRs in AI diagnostics were more wide, implying more variation in their scores than in women. Both sexes exhibited rather smaller IQRs for mental distance, which suggests more consistent responses among the subjects. Men had median scores of about 43 for AI and MBI; women recorded somewhat higher medians of 44.

The **descriptive statistics** for both AI-based and MBI-based burnout scores across genders:

AI Burnout Scores:

Male AI Burnout Scores: Mean: 42.5, Standard Deviation: 6.45, Minimum: 35, Maximum: 50

Female AI Burnout Scores: Mean: 44.75, Standard Deviation: 6.08, Minimum: 38, Maximum: 52

MBI Burnout Scores*:*

Male MBI Burnout Scores: Mean: 43, Standard Deviation: 5.71, Minimum: 36, Maximum: 49

Female MBI Burnout Scores: Mean: 45.75, Standard Deviation: 6.08, Minimum: 39, Maximum: 53

These descriptive statistics provide an overview of burnout scores for both genders across the AI and MBI diagnostics.

The charts (figure 2) above visualize the four key dimensions of burnout assessed by the Burnout Assessment Tool (BAT), including Exhaustion, Mental Distance, Cognitive Impairment, and Emotional Impairment across gender and age groups.

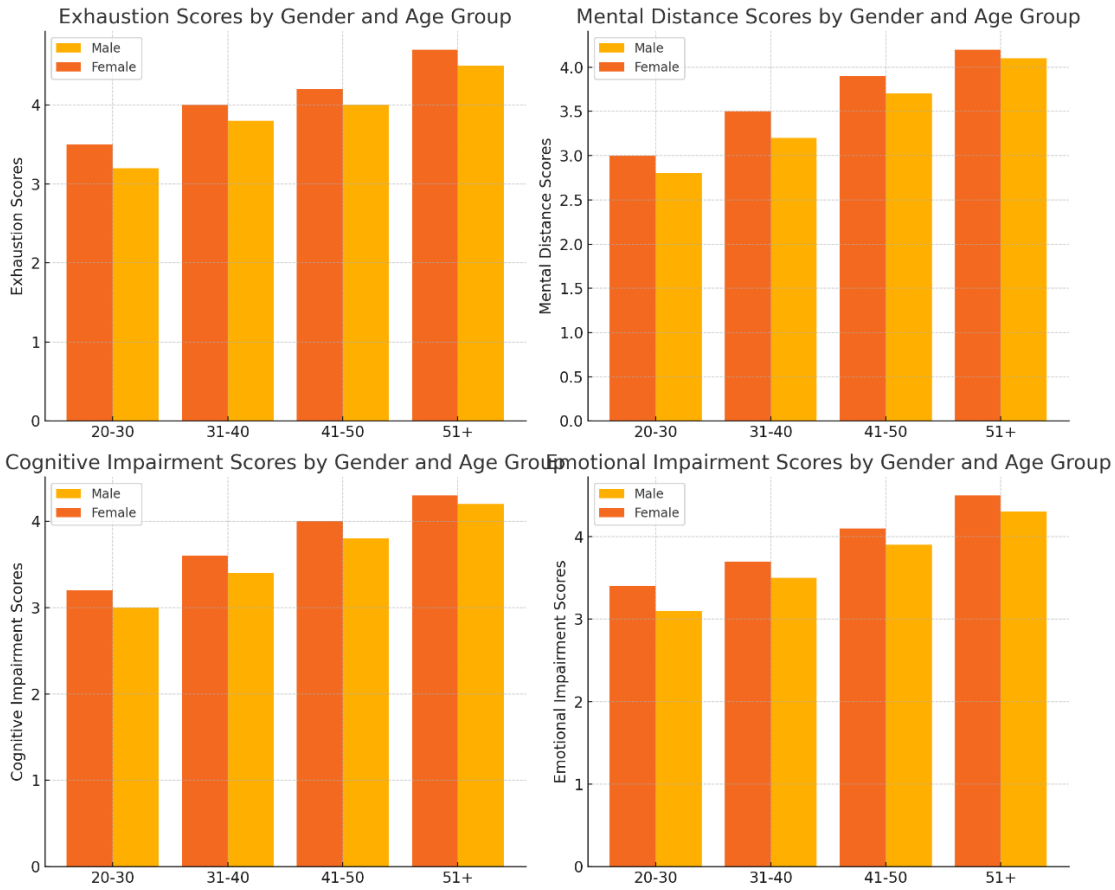

Figure 2 – Burnout Assessment Tool (BAT) Scores by Gender and Age Group

Table 2 – Descriptive Statistics for BAT Burnout Components

	Range	Minimum	Maximum
Male Exhaustion	1.2999999999999998	3.2	4.5
Female Exhaustion	1.2000000000000002	3.5	4.7
Male Mental Distance	1.2999999999999998	2.8	4.1
Female Mental Distance	1.2000000000000002	3.0	4.2
Male Cognitive Impairment	1.2000000000000002	3.0	4.2
Female Cognitive Impairment	1.0999999999999996	3.2	4.3
Male Emotional Impairment	1.1999999999999997	3.1	4.3
Female Emotional Impairment	1.1	3.4	4.5

Table 2 gathered, across males and females the range, lowest, and maximum scores for burnout components. For male tiredness, for instance, the range was 1.3, from a minimum of 3.2 to a maximum of 4.5. With a rather smaller range of 1.2, female tiredness ranged from 3.5 to 4.7. Men said their mental distance ranged from 1.3, from 2.8 to 4.1, while women reported a range of 1.2, from 3.0 to 4.2. The measure of cognitive impairment displayed ranges of 1.2 for both sexes, but with women routinely reporting greater minimum and maximum values.

Exhaustion Scores: Men exhibit a range of 1.3, spanning 3.2 to 4.5. With scores between 3.5 and

4.7, women display a somewhat smaller range of 1.2.This suggests that although the distribution of tiredness is smaller in women, females overall feel somewhat more worn out than men.

Mental Distance: Males fall between 2.8 to 4.1 with a range of 1.3. Women have a smaller range of 1.2, scoring between 3.0 and 4.2.Like tiredness, women report somewhat larger mental distance– that is, apathy or detachment from work–but their distribution across age groups is more constant than that of men.

Cognitive Impairment: Men fall between 3.0 and 4.2; women fall between 3.2 and 4.3, once more demonstrating greater average cognitive decline. With women typically scoring higher in this area, cognitive impairment implies challenges in sustaining focus, concentration, and general mental clarity.

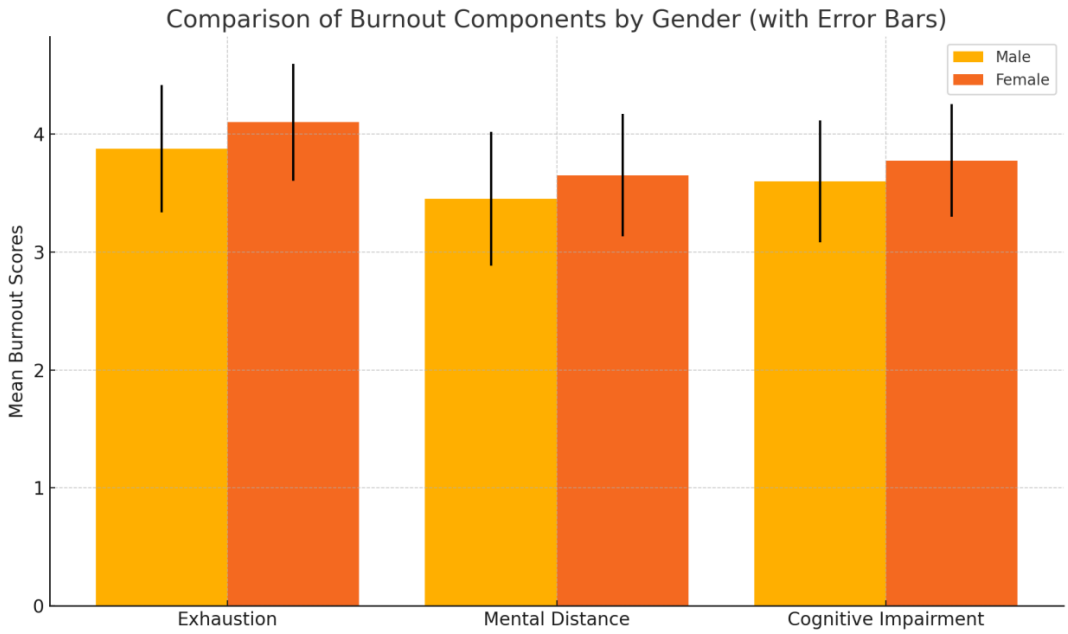

Figure 3 – Comparison of Burnout Components by Gender

For both artificial intelligence-based and MBI-based diagnostics, the bar chart (Figure 3) graphically contrasted the burnout scores across sexes (male and female). While error bars revealed the standard deviation, therefore offering understanding of the group variability, each bar stood for the mean burnout score.

Men showed a mean exhaustion score of 42.5 with a standard deviation of 6.45 for artificial intelligence diagnostics; women showed a somewhat higher mean exhaustion score of 44.75 with a standard deviation of 6.08. Men got a mean exhaustion score of 43.0 (SD = 5.71) for MBI diagnostics; women recorded 45.75 (SD = 6.08).

The map also contrasted cognitive decline and mental distance. In both categories, women routinely reported somewhat higher mean scores than men. In cognitive impairment, for example, women scored a mean of 45.75 (MBI) and 44.75 (AI) while men scored 43.0 (MBI). But as the t-test p-values all exceeded 0.05, the variations between sexes were not statistically significant.

Results of the t-tests for comparing burnout components between males and females:

Exhaustion: t-statistic: -0.615, p-value: 0.561; The p-value is greater than 0.05, indicating no statistically significant difference in exhaustion scores between males and females.

Mental Distance: t-statistic: -0.519, p-value: 0.622; Similarly, there is no statistically significant difference in mental distance between genders.

Cognitive Impairment: t-statistic: -0.497, p-value: 0.637; Cognitive impairment scores also show no significant difference between males and females.

Exhaustion: Both men and women displayed similar degrees of tiredness; women on average showed somewhat more. The t-test, however,

showed that this variation is not statistically significant, meaning that although women may say they are more tired, this is not a regular pattern for the population. The rather low standard deviations for both sexes show that the individuals feel pretty consistently exhausted.

Mental Distance: Though the difference between men and women is small and statistically meaningless, mental distance–which implies detachment or cynicism toward work–is also larger in women. As seen from the higher results for the 51+ age group, mental distance rises with age. Long-term stress or boredom at the workplace can help to explain this trend.

Cognitive Impairment: Men and women reported comparable degrees of cognitive impairment, once more with a minor edge for women. In both sexes, cognitive impairment–such as trouble focusing or maintaining concentration–tends to worsen with age, showing the cumulative effects of burnout. According to the findings, burnout symptoms including mental distance, cognitive impairment, and tiredness are rather equally distributed between sexes; some modest increases for women especially in tiredness. Though gender may contribute to individual burnout experiences, none of these variations are statistically significant, meaning that other elements, including job demands or personal resilience, most certainly have a more major influence.

Across age groups (20–30, 31–40, 41–50, 51+), the line charts in Figure 4 monitored the mean values for burnout components. Men and women used separate lines; each burnout dimension–exhaustion, mental distance, cognitive impairment–was represented on a different chart. Men clearly showed a rising tendency for tiredness; mean scores rose from 3.2 (20–30 age group) to 4.5 (51+ age group). Rising from 3.5 to 4.7, women followed a similar trajectory. This showed that, for both sexes, tiredness always got worse with age; women reported somewhat better scores over all age groups. In mental distance, women climbed from 3.0 to 4.2 while men's scores barely changed from 2.8 (20–30) to 4.1 (51+). The lower range indicated that, with age, detachment from work accelerated less strongly than tiredness. Similar patterns were observed for cognitive impairment: men rising from 3.0 to 4.2 and women from 3.2 to 4.3.

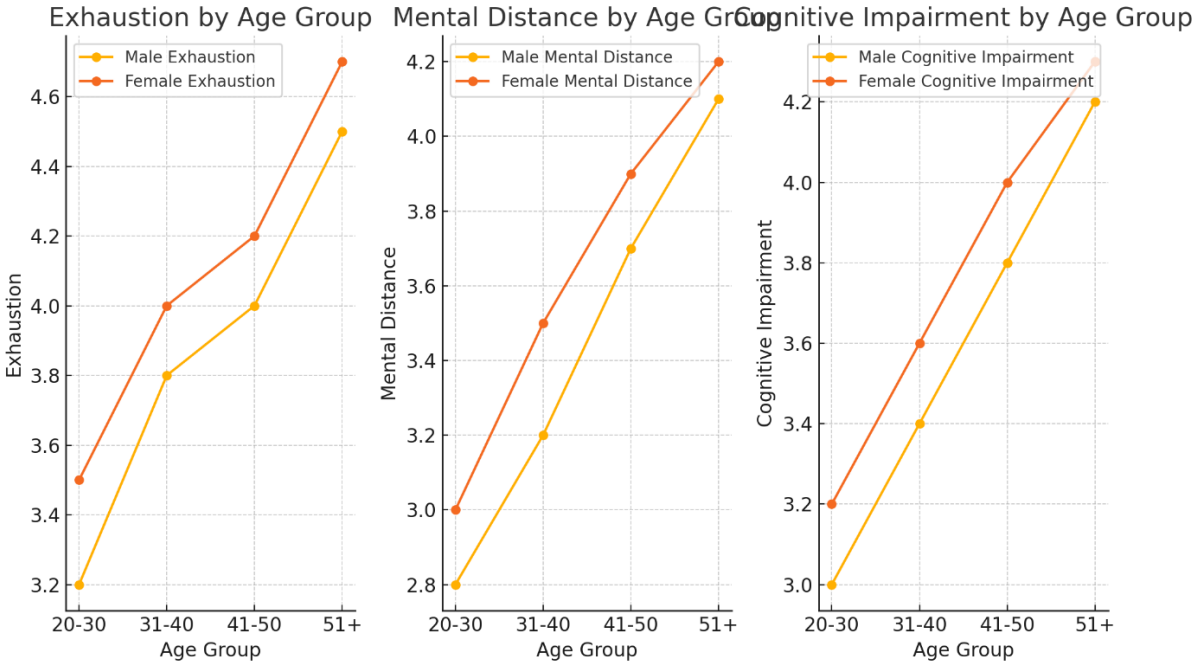

Figure 4 – Exhaustion, Mental Distance, Cognitive Impairment by Age Group

Exhaustion: Both males and females show a noticeable increase in exhaustion as age increases, with the 51+ age group reporting the highest exhaustion scores. Females consistently report higher exhaustion than males across all age groups.

Mental Distance: As one ages, mental distance–which implies a detachment from work–g rises. Particularly in the senior age groups, women show a more higher increase, suggesting more work disengagement in later career phases.

Cognitive Impairment: it follows a similar rising pattern with age; women show better scores than men in every age group. This shows older people have trouble keeping mental clarity and concentration.

ANOVA Results Summary:

- Male Exhaustion: **F-statistic**: 3.39, **p-value**: 0.028. This result is **statistically significant** ($p < 0.05$), indicating that there are significant differences in **male exhaustion scores** across different age groups.

- Female Exhaustion: **F-statistic**: 0.35, **p-value**: 0.789. This is not statistically significant, meaning no significant differences in **female exhaustion scores** across age groups.

- Male Mental Dмistance: **F-statistic**: 0.23, **p-value**: 0.878. No significant differences in **male mental distance** across age groups.

- Female Mental Distance: **F-statistic**: 0.38, **p-value**: 0.768. No significant differences in **female mental distance** across age groups.

- Male Cognitive Impairment: **F-statistic**: 1.24, **p-value**: 0.310. No significant differences in **male cognitive impairment** across age groups.

- Female Cognitive Impairment:

- F-statistic: 0.74, **p-value**: 0.535. No significant differences in **female cognitive impairment** across age groups.

The significant finding for **male exhaustion** indicates that **age** is a key factor in increasing exhaustion levels for males. This confirms the trends observed in the visualizations where exhaustion scores rose consistently with age for males. For females, there were no significant differences in any burnout components across age groups, suggesting that factors other than age may influence their burnout experiences.

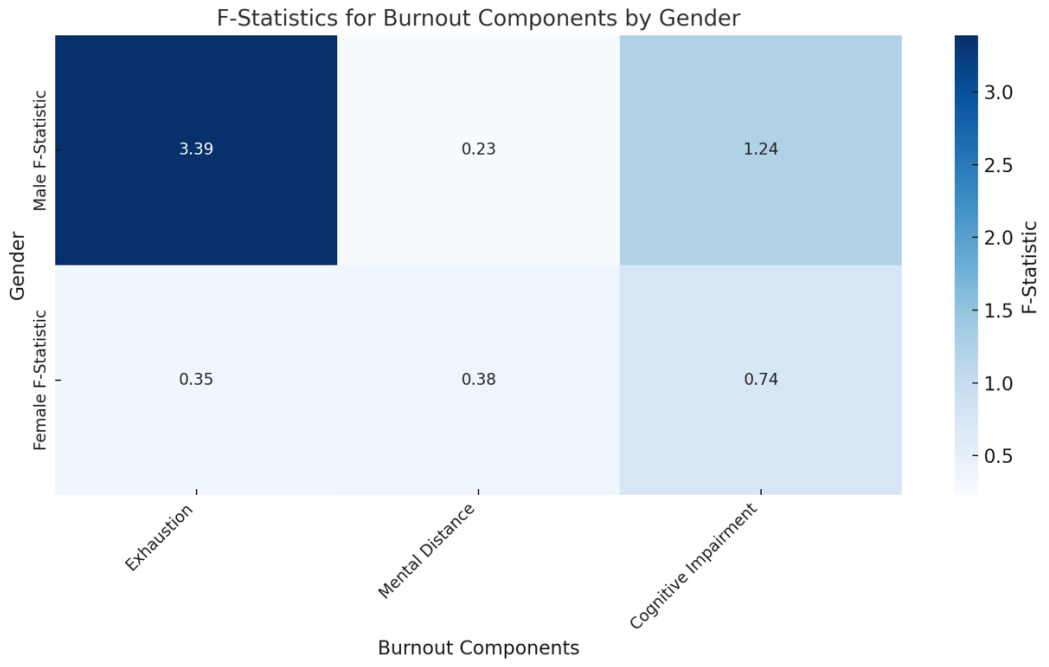

Figure 5 – ANOVA Results Summary

The ANOVA table (Figure 5) compared burnout scores across age groups for each gender and burnout component. For male exhaustion, the F-statistic of 3.39 ($p = 0.028$) indicated a significant difference in scores across age groups, confirming that exhaustion increased significantly with age for males.

For females, the p-value for exhaustion (0.789) was not significant, suggesting that age did not substantially influence their exhaustion levels. Similarly, for mental distance and cognitive impairment, p-values for both genders exceeded 0.05, indicating no statistically significant differences across age groups.

This table made clear which burnout dimensions age affected and underlined the importance of male tiredness as a main age-related element. Men's level of weariness varies much depending on their age group. Men teachers claim they get significantly more weary as their age increases. This suggests, particularly in terms of exhaustion, age-related factors like extended exposure to work stress or less physical resilience could help to induce burnout. Although women consistently rated higher than men on weariness, age had no significant influence. This implies that factors other than age, such workload intensity or personal situation, could influence female weariness degrees more. Men and women demonstrated increasing mental distance and cognitive decline as age increased; yet these differences were not statistically significant. This suggests that although burnout symptoms linked to mental distance (e.g., detachment from work) and cognitive impairment (e.g., difficulty concentrating) rise with age, the variation is not great enough to be considered as a consistent trend across the group.

Recommendations:

Targeted Interventions for Older Teachers: Because older male teachers are much more likely to be tired, schools should create programs to help teachers over 40 avoid and deal with stress. Some ways to avoid long-term burnout are stress management classes, lighter workloads, or more flexible schedules.

Further Research on Female Burnout: This topic of female burnout needs even more research. Since age did not seem to have much of an effect on how exhausted women were, we should look into other things that might make female teachers' fatigue in the future. One way to look at how work-life balance, care responsibilities, or support systems at work can all lead to burnout is by the word "effect."

Holistic Burnout Management Programs: Some signs of burnout, like memory loss and mental distance, got a little worse with age. Because of this, institutions should think about putting in place more comprehensive programs to avoid burnout that look at both physical and mental health. For example, they could offer cognitive exercises or mental health support to help people who are dealing with long-term burnout.

Longitudinal Studies: Longitudinal studies tracking teachers for a few years might be beneficial in order to better understand how stress varies with time. One would acquire understanding of how age, length of employment, and other circumstances influence the emergence of burnout.

Conclusion

Focusing on three basic dimensions – exhaustion, mental distance, and cognitive impairment – this study examined the diagnostic patterns of emotional burnout among instructors. The Burnout Assessment Tool (BAT) provided a framework for the study to expose significant patterns in burnout experiences depending on age and gender. The results showed that burnout is mostly caused by age, especially for male teachers whose levels of tiredness rise noticeably with age. This emphasizes for older male teachers the whole effect of extended stress exposure. Conversely, whereas women claimed consistently higher burnout levels in all spheres, there were no appreciable variations between age groups, implying that elements other than age most certainly affect female burnout. Moreover, whereas for both sexes mental distance and cognitive decline rose with age, the variations were not statistically significant. These results suggest that although aging generates burnout symptoms, its impact varies in many different ways and between sexes. In the end, addressing teacher burnout requires tailored solutions depending on demographic criteria, particularly age and gender. Although additional research is needed to pinpoint the specific reasons of female burnout, older male teachers could benefit from targeted therapy reducing work-related tiredness. Encouragement of sustainable well-being and productivity in the teaching profession hinges on a proactive, all-encompassing approach to burnout avoidance. Although age appears to be a major factor in male tiredness, burnout is a complex problem with a sophisticated response needed. Combining age-specific interventions with more general burnout prevention plans helps lower burnout and raise teacher well-being generally.

References

Adamson G., Kelchner M. (2021) Exploring AI and emotional burnout diagnostics in education: Trends and Opportunities. *Educational Psychology Today*, vol. 39(2), pp. 129–145.

Brouwers A., Tomic W. (2000) A longitudinal study of teacher burnout and perceived self-efficacy in classroom management. *Teaching and Teacher Education*, vol. 16(2), pp. 239–253.

Casu M., Triscari S., Battiato S., Guarnera L., Caponnetto P. (2024) AI Chatbots for Mental Health: A Scoping Review of Effectiveness, Feasibility, and Applications. *Applied Sciences*, vol. 14(13), p. 58-89.

Freudenberger H. J. (1974) Staff burn-out. *Journal of Social Issues*, vol. 30(1), pp. 159–165.

Hakanen J.J., Bakker A.B., Schaufeli W.B. (2006) Burnout and work engagement among teachers. *Journal of School Psychology*, vol. 43(6), pp. 495–513.

Kaziev K.O., Mukhanbetzhanova A.U., Mugauina G.O., Bisenov Sh.N., Zhangaizyeva B.S. (2024) Nekotorye aspekty profilaktiki professionalnogo emocionalnogo vygoraniia pedagogov v vuze [Some aspects of prevention of professional emotional burnout of university educators]. *Vestnik KazNPU imeni Abaya. Seriya Pedagogicheskie nauki,* no 2(81), pp.19-32. (In Russian)

Kyriacou C. (2011) Teacher stress: Directions for future research. *Educational Review*, vol. 53(1), pp. 27–35.

Larrivee B. (2012) Cultivating Teacher Renewal: Guarding Against Stress and Burnout. United States: Rowman & Littlefield Education, 200 p.

Madaliyeva Z.B. (2002) Psikhologicheskie osnovy upravleniia emocionalnym sostoyaniem uchitelia [Psychological foundations of managing teachers' emotional states]: dis. … kand.psikhol.nauk: 19.00.07. Almaty, 158 p. (In Russian)

Maslach C., Jackson S.E., Leiter M.P. (1996) Maslach Burnout Inventory Manual (3rd ed.). Palo Alto, CA: Consulting Psychologists Press, 28 p.

Morris R.R., Kouddous K., Kshirsagar R., Schueller S.M. (2018) Towards an artificially empathic conversational agent for mental health applications: system design and user perceptions. *Journal of Medical Internet Research*, vol. 20(6), 10 p.

Niyazova A., Madaliyeva Z. (2022) Impact of Resilience on Psychological Well-Being. *Journal of Intellectual Disability – Diagnosis and Treatment*, vol. 10, pp. 178-186.

Sarbassova G., Kudaibergenova A., Madaliyeva Z., et al. (2024). Diagnostics of psychological flexibility and the ability to cope with the inevitable changes among psychology students. *Current Psychology,* vol. 43, pp. 5364–5376.

Schaufeli W.B., Desart S., De Witte H. (2020) Burnout Assessment Tool (BAT)-Development, Validity, and Reliability. *International journal of environmental research and public health*, vol. 17(24), pp. 94-95.

Schaufeli W.B., Leiter M. P., Maslach C. (2009) Burnout: 35 years of research and practice. *The Career Development International*, vol. 14(3), pp. 204–220.

Uğur H., Constantinescu P., Stevens M.J. (2015) Self-awareness and personal growth: Theory and application of Bloom's Taxonomy. *Eurasian Journal of Educational Research*, vol. 15, pp. 89-110.

Литература

Adamson G., Kelchner M. Exploring AI and emotional burnout diagnostics in education: Trends and opportunities // *Educational Psychology Today*. – 2021. – Vol. 39. – № 2. – P. 129–145.

Brouwers A., Tomic W. A longitudinal study of teacher burnout and perceived self-efficacy in classroom management // *Teaching and Teacher Education*. – 2000. – Vol. 16. – №2. – P. 239–253.

Casu M., Triscari S., Battiato S., Guarnera L., Caponnetto P. AI Chatbots for Mental Health: A Scoping Review of Effectiveness, Feasibility, and Applications // *Applied Sciences*. – 2024. – Vol. 14. – № 13. – P. 58-89.

Freudenberger H.J. Staff burn-out // *Journal of Social Issues*. – 1974. – Vol. 30. – №. 1. – P. 159–165.

Hakanen J.J., Bakker A.B., Schaufeli W.B. Burnout and work engagement among teachers // *Journal of School Psychology*. – 2006. – Vol. 43. – № 6. – P. 495–513.

Казиев К.О., Муханбетжанова А.У., Мугаuина Г.О., Бисенов Ш.Н., Жангазиева Б.С. Некоторые аспекты профилактики профессионального эмоционального выгорания педагогов в вузе // *Вестник КазНПУ имени Абая. Серия педагогические науки.* – 2024. – № 2(81). – С. 19-32.

Kyriacou C. Teacher stress: Directions for future research // *Educational Review*. – 2011. – Vol. 53. – № 1. – P. 27–35.

Larrivee B. Cultivating Teacher Renewal: Guarding Against Stress and Burnout. – United States: Rowman & Littlefield Education. – 2012. – 200 p.

Мадалиева З.Б. Психологические основы управления эмоциональным состоянием учителя: дис. … канд.психол.наук: 19.00.07. – Алматы, 2002. – 158 с.

Maslach C., Jackson S.E., Leiter M.P. Maslach Burnout Inventory Manual (3rd ed.). – Palo Alto, CA: Consulting Psychologists Press, 1996. – 28 p.

Morris R.R., Kouddous K., Kshirsagar R., Schueller S.M. Towards an artificially empathic conversational agent for mental health applications: System design and user perceptions // *Journal of Medical Internet Research*. – 2018. – Vol. 20. – № 6. – 10 p.

Niyazova A., Madaliyeva Z. Impact of Resilience on Psychological Well-Being // *Journal of Intellectual Disability Diagnosis and Treatment*. – 2022. – Vol. 10. – P. 178-186.

Sarbassova G., Kudaibergenova A., Madaliyeva Z. Diagnostics of psychological flexibility and the ability to cope with the inevitable changes among psychology students // *Current Psychology*. – 2024. – Vol. 43. – P. 5364–5376.

Schaufeli W.B., Desart S., De Witte H. Burnout Assessment Tool (BAT) – Development, Validity and Reliability // *International Journal of Environmental Research and Public Health*. – 2020. – Vol. 17. – №24. – P. 94-95.

Schaufeli W.B., Leiter M.P., Maslach C. Burnout: 35 years of research and practice // *The Career Development International*. – 2009. – Vol. 14. – №3. – P. 204–220.

Uğur H., Constantinescu P., Stevens M.J. Self-awareness and personal growth: Theory and application of Bloom's Taxonomy // *Eurasian Journal of Educational Research*. – 2015. – Vol. 15. – P. 89-110.

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