Academic burnout of digital natives and social sustainability: prevalence and risk factors[*][1]

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Abstract

As higher education institutions play a key role in setting a foundation for a sustainable workforce, it is their responsibility to create an environment in which students' well-being will be preserved. In this regard, contemporary universities encounter a significant challenge – the increasing presence of academic burnout syndrome which negatively affects students' health, career preparedness, and subsequent job performance. While previous burnout studies mostly focused on Millennial students, this study aims to examine burnout prevalence and risk factors among Generation Z, the first true digital natives. Therefore, the study proposes a conceptual model exploring the impact of seven background factors (demographic and situational) on four dimensions of academic burnout, as well as students' overall burnout. The model is tested on a sample of university students from

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Serbia, using the Structural Equation Modelling (SEM) analysis. The results indicate that a quarter of the surveyed students experience overall burnout, while over 60% report experiencing some degree of personal burnout. Furthermore, two confirmed hypotheses reveal that Generation Z's academic burnout is significantly linked to age and whether students study in their hometown. Three partially confirmed hypotheses suggest that certain academic burnout dimensions are also connected to gender, GPA, and tuition payment.

1. Introduction

The long-term development of society cannot be achieved without the essential prerequisites that ensure the health of its members (Sen, 1991). Moreover, health has been identified as a key factor in the social aspect of sustainability in every domain, be it organizational, community-related, or individual (Reyna-Castillo et al., 2022). Henceforth, monitoring and nurturing students' health stands out as a foundational element of socially sustainable universities (Reyna-Castillo et al., 2022).

In light of this perspective, one of the greatest challenges of contemporary higher education is the burnout syndrome presence among the population of students. Equivalent in nature to job burnout, academic burnout occurs as a student's reaction to prolonged stress in the academic environment (Shin et al., 2012). It is commonly depicted as a state of the uttermost emotional exhaustion and the depletion of one's resources, accompanied by a series of emotional, physical, and cognitive impairments (Maslach, 2001). The consequences of academic burnout impact not only the suffering individuals but also their families, university, and, in the long run, society as a whole (Neumann et al., 1990). As most of the previous research focused on the burnout of Generation X and Y, it is vital to investigate Generation Z's academic burnout so that adequate interventions can be tailor-made.

With this in mind, the main objectives of this research are a) to examine the prevalence of academic burnout among Generation Z students, and b) to identify background factors that contribute to the occurrence of Generation Z academic burnout by testing a new conceptual model that links these factors to academic burnout. To achieve these objectives and answer theresearch question – *To what extent does the current population of university students experience academic burnout, and which background factors contribute to its occurrence?*, the study proposes aconceptual model exploring the effects of seven demographic and situational factors – students' gender, age, GPA, employment status, tuition payment status, living expense coverage support, and studying in their hometown –

on four dimensions of academic burnout, and students' overall burnout. The model is tested on the sample of studentsfrom the University of Belgrade – Faculty of Organizational Sciences (FOS), utilizing SEM analysis.The student version of the Copenhagen Burnout Inventory – (CBI-S) is used to measure academic burnout.

In contrast to former studies primarily examining generations X and Y burnout, this study makes a scientific contribution by exploring burnout of the under-researched cohort of Generation Z university students. Additionally, by focusing on the role of seven background factors – gender, age, GPA, employment status, tuition payment, living expense support, and studying in one's hometown – the study advances knowledge on how these variables affect overall academic burnout, but also its personal, studies-related, colleagues-related and teachers-related dimensions.

The first part of the paper presents the literature review connected to the observed phenomenon and the examined population. The second part of the paper presents the proposed conceptual models, obtained results, and their discussion. The findings should fill the existing literature gap regarding the burnout of Generation Z and provide guidelines for the design of the corresponding prevention and reduction strategies.

2. Literature review

The literature review addresses burnout syndrome, its connection to sustainability, and previous findings regarding the specific burnout risk factors. It also delineates the characteristics of Generation Z.

2.1. Academic burnout

Throughout the years, burnout syndrome has become one of the most prevailing stress-related consequences. It was first noticed and subsequently researched among the nursing staff and physicians, the professionals for whom a high degree of emotionally challenging situations and intense contact with people in need is inevitable (Freudenberger, 1974). The succeeding research recognized its presence among all 'helping professions', including psychologists, professors, social workers, and the like (Leiter and Schaufeli, 1996), and finally, it was observed in individuals across all occupations (Leiter and Schaufeli, 1996). Simultaneously, it was discovered that university students can also experience burnout (Backović et al., 2012; Ivančević et al., 2023a).

Academic or student burnout *per se* is viewed as the outcome of prolonged academic stress, energy depletion, and a gradual decline of enthusiasm for academic endeavours caused by a variety of internal, external, and situational factors (Ivančević

et al, 2023b). The syndrome entails numerous psychological, physical, and emotional symptoms including depression, anxiety, and suicidal ideation (Maslach et al., 2001), sleeping difficulties, gastrointestinal and cardiac complications (Ahola and Hakanen, 2014), as well as negative behavioural and communication changes (Ivančević et al., 2023b), affecting these individuals' interaction with the community surrounding them. In addition, burned-out students tend to use ineffective and dysfunctional coping mechanisms, such as substance use, self-blame, behavioural disengagement, and venting (Spataro et al., 2016; Ivančević et al., 2022), that further exacerbate students' health and behavioural issues. All of these changes contribute to a variety of negative academic outcomes, such as a decline in learning motivation and engagement (Sulea et al., 2015), heightened intention to discontinue studies as well as the actual increase in the number of students who leave universities (Bumbaccoand Scharfe, 2023).

2.2. Social sustainability and academic burnout

Researchers of social sustainability emphasize that one of the foremost challenges of today's higher education is academic burnout (Reyna-Castillo et al., 2022). Its effects on social sustainability are twofold, encompassing its present and future dimensions as its consequences target both the current population of students and the future workforce. The specific reasons for this impact are explained below.

First and foremost, burnout syndrome comprises the aforementioned health-related problems decreasing students' resilience and overall capacity to positively contribute to society. Further, instead of being preserved and nurtured during their academic years, the health of these individuals is already compromised upon entering the workforce. This causes their increased susceptibility to other illnesses as well as job burnout (Robins et al., 2018), and creates negative work outcomes, such as higher absenteeism rates, lower organizational commitment as well as increased turnover (Azam et al., 2017). These subsequently impact the companies' financial health, leading to increased costs related to employees' sick leaves and the necessity for additional recruitment, selection, onboarding, and training expenses for new hires.

Academic burnout jeopardizes students' cognitive ability and engagement in their coursework (Sulea et al., 2015), which consequently decreases their vocational knowledge, and annunciates reduced professional achievement (Dyrbye and Shanafelt, 2016). Such lack of competencies and success potential can negatively affect the performance of entire departments and organizations students will work for after graduation, reducing their sustainability. Furthermore, burnout is shown to be connected with university students' drop-out rates (Bumbaccoand Scharfe, 2023). Also, students frequently choose courses in accordance with their feeling of exhaustion (Dyrbye and Shanafelt, 2016). Both lead to a shortage of professionals

in certain fields and specialities (Dyrbye and Shanafelt, 2016) and jeopardize the sustainability of those professions. Burnout also deteriorates students' altruistic professional values, reduces their empathy, and increases dishonest conduct (Dyrbye and Shanafelt, 2016) – all trends against desirable and socially sustainable academic and workplace behaviours.

All these reasons underscore the significance of early detection and prevention of burnout within the academic environment.

2.3. Digital natives – Generation Z

Generation Z is a demographic cohort that follows the Millennial generation, encompassing individuals born between 1995 and 2012 (Wulandari et al., 2023). This generation comprises the current population of university students, with its oldest members having already entered the workforce. Generation Z or iGeneration is the first generation that has been exposed to the Internet and portable digital devices since childhood and is therefore considered true digital natives (Francis and Hoefel, 2018). They are characterized as digital integrators, open-minded and realistic, but displaying more individualistic tendencies and less respect for authority than prior generations (Wulandari et al., 2023). Consequently, they are shown to have different attitudes towards both academic and job prospects (Francis and Hoefel, 2018), money, and economic issues (Seyfi et al., 2023). Modern technology and information access made them aware of global issues and their impact from a young age, resulting in them becoming very interested in sustainable development and trying to follow sustainability principles in all their activities (Dabija et al., 2020). Nevertheless, Generation Z representatives are more commonly diagnosed with psychiatric disorders and intellectual disabilities (Buckley et al., 2020). Moreover, according to Schroth (2019), they display a higher level of psychological distress compared to the previous generations, which can be an indicator of higher burnout prevalence.

Additionally, in contrast to the previous generations of students, they have undergone an unprecedented educational experience having spent a part of their university years learning within an emergency online environment (Ivančević et al., 2023a) which differs from regular distance learning (Krsmanovic et al., 2012). During this time, they faced notably heightened levels of anxiety whichwas related to burnout (Ivančević et al., 2023a). Finally, the data show that they were not able to accumulate substantial human capital skills, necessary for regular socioemotional development (Reyna-Castillo et al., 2022).

Therefore, to ensure a socially sustainable educational environment for Generation Z students and soon-to-be employees, it is important to assess burnout prevalence among them and determine the connected risk factors.

338

Sonja Ivančević et al. • *Academic burnout of digital natives and social sustainability...*
Zb. rad. Ekon. fak. Rij. • *2024* • *Vol. 42* • *No. 2* • *333–360*

2.4. Factors influencing academic burnout

Several demographic and situational factors will be taken into consideration while examining the academic burnout of Generation Z.

2.4.1. Gender

Social sustainability pays special attention to gender equality. Therefore, it is important to determine whether the examined educational environment equally preserves the well-being of both genders, including their risk of burnout development. Most previous studies examining the influence of gender on student burnout show higher burnout levels in female students (Backović et al., 2012; Spataro et al., 2016). However, Palupi and Findyartini's (2019) study shows no significant differences in the levels of burnout between the two genders, and Talih et al.'s (2018) study shows greater burnout levels in male students. All of these contribute to Fiorilli et al.'s (2022) suggestion that further examination of student burnout-gender connection is required. Therefore, we propose the following hypothesis:

H1: Female gender is positively connected to the measured level of academic burnout.

2.4.2. Age

In addition to gender, Baumgardt et al. (2015) suggest that one of the factors that should be taken into account to increase sustainability regarding burnout is age. Prior researchhas also provided ambivalent results regarding age as a burnout predictor. Whereas some studies have found that burnout levels increase with age (Dyrbye et al., 2006; Galán et al., 2011), emerging findings targeting Generation Z indicate that burnout levels can be higher in younger students (Fernández-Castillo and Fernández-Prados, 2022). Also, there are results linking age with specific burnout dimensions, such as cynicism, antipathy, inefficacy, and exhaustion (Lee et al., 2013). It is necessary to mention that students' burnout dynamics may also depend on the specific university context and that separate examinations are required. Therefore, the following hypothesis is proposed:

H2: Student age is positively connected to the measured level of academic burnout.

2.4.3. Grade point average

Student performance or success often refers to the extent to which students are progressing in gaining knowledge and developing skills as they work towards their educational goals (Eid and Al-Jabri, 2016). It is usually measured through

students' GPA, indicating an average level of their accomplishments across a range of academic courses. Whereas students with high GPAs are frequently viewed as future social and economic drivers of their countries, striving to achieve high performance can put tremendous stress and pressure on students (Huan et al. 2008), potentially reducing their actual contribution to society. In line with this, previous studies have indicated that students' GPA can be a predictor of burnout or at least of some of its dimensions, such as emotional exhaustion (Jacobs and Dodd, 2003). Due to the specific attitude of Generation Z students toward educational progress (Francis and Hoefel, 2018), it is important to examine whether their academic success can cause burnout. Therefore, the following hypothesis is proposed:

H3: Students' success measured through their GPA is positively connected to the measured level of academic burnout.

2.4.4. Employment status

Students' decision to engage in employment during their academic years can be attributed to the necessity of covering their living expenses as well as substantial tuition fees (Drăghici and Cazan, 2022). However, researchers investigating the health of employed students emphasize that they are likely to experience burnout because they need to manage both university and work demands simultaneously (Schramer et al., 2020). Namely, in such a division of engagement and the lack of time and energy for the appropriate self-care routines, they gradually experience exhaustion both concerning their employment and academic responsibilities (Schramer et al., 2020). Nevertheless, Dundes and Marx's (2006) study provides different findings, showing that, in the long run, employment leads to better performance in students and reduced stress level. Thus, to determine whether being employed while studying is socially sustainable, further exploration is needed and we propose the following hypothesis:

H4: Student employment is positively connected to academic burnout.

2.4.5. Finance-related factors – tuition payment status and living expense coverage support

Irrespective of employment status, students often face financial burdens that can lead to continuous stress, potentially resulting in burnout. Namely, researchers have confirmed that financial strain is one of the most prevalent sources of stress among university students (Hayes, 2006). It can be generated by specific financial demands and circumstances of students and apart from jeopardizing their integration into academic and social aspects of university life, cause serious psychological problems (Adams et al., 2016). However, there is a lack of evidence regarding the influence of particular finance-related factors on academic burnout.

Therefore, this study is going to examine the relationship between tuition payment status and burnout. Marôco and Tecedeiro (2009) have drawn attention to the stresses associated with financing one's academic studies, and Miltojević et al. (2021) examined the relation between the tuition fee status and inadequacy, cynicism, and exhaustion, as burnout dimensions, showing that a greater proportion of self-financed students demonstrate severe levels of exhaustion in comparison to those who are budget-financed. In contrast, budget-financed students are found to be more prone to feeling inadequacy (Miltojević et al., 2021). Nonetheless, the examination between the tuition payment status and students' burnout dimensions measured by the CBI-S is required.

Also, struggling to cover the costs connected to basic needs, such as housing, food, transportation, and other necessities can cause tremendous stress and exhaustion, while adequate support could alleviate these feelings (Adams et al., 2016). Thus, the study is also going to investigate how the extent of financial support for living expenses influences student burnout.

Therefore, we propose the following hypotheses:

H5: Self-financing one's studies is positively connected to academic burnout.

H6: Full financial parental support is negatively connected to academic burnout.

2.4.6. Studying in their hometown

The relationship between students studying in their hometown or elsewhere and the occurrence of student burnout has not been frequently examined. However, the distinction between the two might be critical for burnout development. On the one hand, living in a familiar environment can be very comforting for students, providing them with the usual support from their family and friends, which can be considered study resources (Lesener et al., 2020). It also protects them from facing stressors that stem from transitioning and adjusting to a new environment (Yang and Farn, 2005). On the other hand, new surroundings may provide students with new perspectives and experiences, giving them new developmental opportunities (Lesener et al., 2020) and relieving them from the potential pressure they feel at home. Thus, it is important to discover whether this difference significantly influences students' well-being and which option is more socially sustainable burnout-wise.

Therefore, the following hypothesis is proposed:

H7: Studying in their hometown is negatively connected to academic burnout.

3. Method

The sectiondescribes the conveyed survey and the used instrument, whereas the analysis employed isdepicted in the following section.

3.1. Conveyed survey

The cross-sectional survey was conducted in 2024 and encompassed the University of Belgrade – Faculty of Organizational Sciences (FOS) students. The survey utilized a convenience sampling method, including students who were present in class and willing to participate in the research. The questionnaire was created in an online format and distributed to students by the academic staff. Students completed the questionnaire on the spot, utilizing their mobile phones. To protect students' rights and ensure the integrity of the research, we addressed the following ethical considerations. Firstly, students were informed about the survey's purpose and how their data would be used. Also, the survey was anonymous, with a guarantee of confidentiality. Finally, as with other student surveys, we aimed to establish a supportive environment where students felt encouraged to give honest answers.

After conducting the survey, the relationships between the selected factors and academic burnout were analysed. Conceptual models designed to evaluate the suggested hypotheses are shown in Figure 1 and Figure 2, presented in the following sections. The models were tested with the use of SEM analysis also presented below.

3.2. Instruments

The opening segment of the questionnaire encompassed questions regarding students' demographic and situational characteristics, including gender, age, GPA, whether they study in their hometown, employment status, tuition payment status, and the way of financing their costs of living. The following segment of the questionnaire comprised the CBI-S, a standardized inventory measuring student burnout. Kristensen et al. (2005) developed the original scale, and the student adaptation was subsequently created and verified by Campos et al. (2013). CBI-S inventory consists of four scales estimating four dimensions of student burnout – Personal burnout, Studies-related burnout, Colleagues-related burnout, and Teachers-related burnout – comprising six, seven, six, and six items in the corresponding order. Responses from students are rated on a 5-point Likert-type scale (1=Never or 0% of times and 5=Always or 100% of times).

342

Sonja Ivančević et al. • *Academic burnout of digital natives and social sustainability...*
Zb. rad. Ekon. fak. Rij. • *2024* • *Vol. 42* • *No. 2* • *333–360*

4. Empirical data and analysis

The section depicts the sample characteristics and the determined students' burnout levels. Italso presents the SEM analysis utilized for examining the relationships between the selected variables within two proposed conceptual models. The results of the models' assessment are presented as well.

4.1. Sample characteristics

The sample includes answers provided by 819 FOS students. Out of the total number of respondents, 226 are male students (27.6%) and 593 are female students (72.4%). This perceived gender imbalance was anticipated due to two primary factors: firstly, women are more inclined to participate in surveys, and secondly, there is a higher enrollment of female students at FOS. The research includes students from each of the four academic years: first (26.0%), second (34.6%), third (20.6%), and fourth (18.8%). Respondents' average age is 20.67 with a standard deviation of 1.382. The age span ranges from 18 to 28, with a median of 20. The observed range can be ascribed to the fact that some students may have started their studies a year earlier, while others may have needed to repeat a year. Regardless, all students belong to the targeted Generation Z at the time of the study. The average of all participants' GPAs is 8.16 (measured on a scale of 6 to 10), with a standard deviation of 0.720, and the median being 8.09. Concerning respondents' tuition fee status, 527 (64.3%) of the respondents have their tuition covered by the Republic of Serbia's budget (budget-financed students), while 292 (35.7%) are self-financed. In addition, 375 students, representing 45.8% of the total sample, study in their hometown, compared to 444 (54.2%) who do not. As for respondents' employment status, the majority of students (64.0%) are not employed, whereas 36% of them are employed. Finally, with respect to covering their living expenses, 640 (78.1%) are fully supported by their parents, while 21.9% of students cover all costs on their own or receive only partial financial support from external sources.

4.2. Student burnout levels

The first objective of the study is to examine the prevalence of academic burnout among students belonging to Generation Z. For this purpose, the student version of the CBI inventory is utilized. The inventory measures four burnout dimensions, including personal burnout (an overall feeling of exhaustion), studies-related burnout (exhaustion caused by academic pressures), colleagues-related burnout (exhaustion stemming from relationships with peers), and teachers-related burnout (exhaustion caused by interactions with faculty). In addition, unlike the Maslach Burnout Inventory (MBI), the CBI-S enables the determination of an overall burnout score. Analyzing burnout syndrome from both perspectives is

beneficial, as the use of the overall burnout score enables comparisons among student populations and highlights differences in burnout across time, countries, institutions, and educational settings, whereas examining separate dimensions helps pinpoint the most affected aspects of student life, allowing for tailored support systems.

According to Campos et al. (2013), burnout severity is assessed using a scale ranging from 0 to 100, where scores between 50 and 74 indicate that students are moderately exposed to burnout, scores between 75 and 99 indicate high burnout, whereas a score of 100 indicates severe burnout. Scores under 50 suggest the absence of burnout.

Students are mostly exposed to two dimensions of burnout: personal and studies-related, whereas nearly a quarter of students encounter moderate overall burnout.

Table 1: Quantity of students in each dimension of burnout categorized by severity, percentage representation within the sample, and mean, standard deviation, and median for the entire sample

	Severity	Score	Number of students	Percentage of sample	Mean ± STD	Median
Personal burnout	Moderate	50 – 74	308	37.6%	56.23 ± 23.24	54.64
	High	75 – 99	172	21.0%		
	Severe	100	38	4.6%		
Studies-related burnout	Moderate	50 – 74	232	28.30%	46.50 ± 24.64	42.18
	High	75 – 99	128	15.60%		
	Severe	100	3	0.40%		
Colleagues-related burnout	Moderate	50 – 74	132	16.10%	30.26 ± 24.17	25.00
	High	75 – 99	40	4.90%		
	Severe	100	11	1.30%		
Teachers-related burnout	Moderate	50 – 74	97	11.80%	22.60 ± 21.81	16.67
	High	75 – 99	15	1.80%		
	Severe	100	8	1.00%		
Overall burnout	Moderate	50 – 74	195	23.80%	38.90 ± 17.58	37.64
	High	75 – 99	25	3.10%		
	Severe	100	0	0.00%		

Source: Author's calculations

4.3. Exploration of factors that impact the levels of burnout

The second objective of the research is to determine whether different background factors impact the levels of specific students' burnout dimensions, and their overall burnout. To explore theserelations, the study proposes two conceptual models that are tested with the use ofSEM analysis.

4.3.1. SEM analysis

In this study, we investigate the impact of seven categorical factors on student burnout using Ordinal-Probit SEM-MIMIC model. The traditional Maximum Likelihood (ML) estimator, commonly employed in SEM analysis, was unsuitable for our dataset, which primarily consisted of categorical and ordinal variables from our survey (Milenković et al., 2019). For such non-normal data, Bollen (1989) recommends the Weighted Least Squares (WLS) approach, as it requires fewer distributional assumptions. The Diagonally Weighted Least Squares (DWLS) is a robust WLS method based on the polychoric correlation matrix of the variables included in the analysis. The DWLS is usually used in situations in which the assumption of multivariate normality is severely violated and data are ordinal, as it provides more accurate parameter estimates (Mindrila, 2010). This algorithm uses only the diagonal of weights in inversion, and all weights in estimation of fit and standard error. Therefore, we employed the (DWLS) estimator, available in the R package Lavaan (Rosseel, 2012) for our analysis. This methodology has been successfully applied in different spheres of research, particularly in studies examining public transport satisfaction and loyalty (Allen et al., 2018).

Before we conducted the SEM analysis and verified the proposed conceptual models, the assessment of the internal consistency of the scales within the models had been conducted. For that purpose, we used the Cronbach's alpha (Cronbach, 1951). Besides Cronbach's alpha, we present the AVE (Average Variance Extracted) and CR (Composite Reliability). AVE should be greater than 0.5, while CR should be above 0.7.

The calculated values of Cronbach's alpha, AVE and CR are displayed in Table 2 (per separate academic burnout dimensions) and Table 3 (for the overall burnout scale). Notably, all values are above 0.7, signifying favourable internal consistency of all the observed scales. The measured Cronbach's alphas are on the interval from 0.890 (*Studies-related burnout*) to 0.917 (*Teachers-related burnout* and *Overall burnout*). All AVEs and CRs are also above the defined thresholds. Given the consideration that the metrics of internal consistency are above the defined threshold, we can proceed with the SEM analysis with no modifications to the initial scales.

The first model we evaluated is the model examining the impact of students' gender, age, GPA, employment status, tuition payment status, living expense coverage

support, and studying in their hometown on four separate burnout dimensions, including personal burnout, studies-related, colleagues-related, and teachers-related burnout. The model is visually presented in Figure 1.

Figure 1: Proposed conceptual model 1.
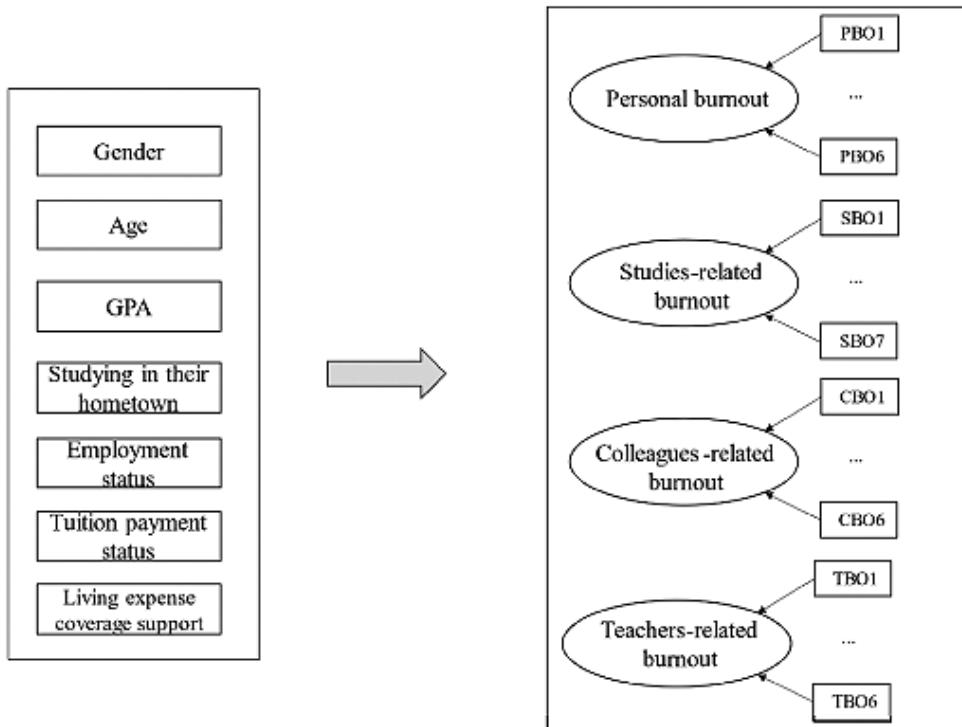
Source: Author's construction

The assessment of the initial model metrics indicates a solid fit (Chi-square=378.455, df=416, p<0.000, CFI=0.991, TLI=0.981, SRMR=0.034). Due to model complexity, all paths between predictors and dependent constructs (burnout) that were not statistically significant were removed from the model. Having in mind the sample size and the model complexity, it can be inferred that the slightly improved model satisfactorily fits the data. The final model fit is: Chi-square=368.078, df=379, p<0.000, CFI=0.990, TLI=0.980, SRMR=0.033). The removal of these paths did not impact in any way the model quality as the value of the Chi-square statistics comparison test had the p-value greater than 0.05.

The results of Model 1 showing the statistically significant paths are presented in Table 2.

346

Sonja Ivančević et al. • Academic burnout of digital natives and social sustainability...
Zb. rad. Ekon. fak. Rij. • 2024 • Vol. 42 • No. 2 • 333–360

Table 2: Results of the Model 1 assessment – constructs, predictors, estimated paths, values of the Z statistics, R square, Cronbach's alfa, AVE, and CR

Construct	Predictor	Estimate Std	Z value	P-value	R^2	Cronbach's alfa	AVE	CR
Personal burnout	Gender	-0.152	-7.726	0.000	0.034	0.891	0.657	0.920
	Age	0.081	4.153	0.001				
	Studying in their hometown	-0.038	-1.966	0.049				
Studies-related burnout	Gender	-0.047	-2.606	0.009	0.014	0.890	0.617	0.915
	Age	0.085	4.225	0.000				
	Studying in their hometown	-0.054	-2.957	0.003				
	Employment status	-0.041	-2.100	0.036				
	Age	0.139	7.097	0.000				
	GPA	0.055	2.966	0.003				
Colleagues-related burnout	Age	0.139	7.097	0.000	0.022	0.908	0.700	0.933
	GPA	0.055	2.966	0.003				
Teachers-related burnout	Gender	0.098	4.858	0.000	0.029	0.917	0.710	0.936
	Age	0.085	4.202	0.000				
	GPA	-0.043	-2.154	0.031				
	Studying in their hometown	-0.095	-5.138	0.000				

Source: Author's calculations

Embracing the possibility of estimating an overall burnout score that the CBI-S allows for, we also evaluated a model that examines the impact of students' gender, age, grade point average (GPA), employment status, tuition payment status, living expense coverage support, and studying in their hometown on students' overall burnout. The model is visually presented in Figure 2. In Model 2, we created a higher-level construct *Burnout* instead of using mean sub-scale values to create it. More precisely, to create the construct *Burnout*, we have not used the mean values of scales Personal burnout, Studies-related burnout, Colleagues-related burnout, and Teachers-related burnout. Namely, each of the subscales is modelled as an individual construct, which is used to form the construct *Burnout*. The same approach was taken in the study of Ivančević et al. (2023a).

Figure 2: Proposed conceptual model 2.
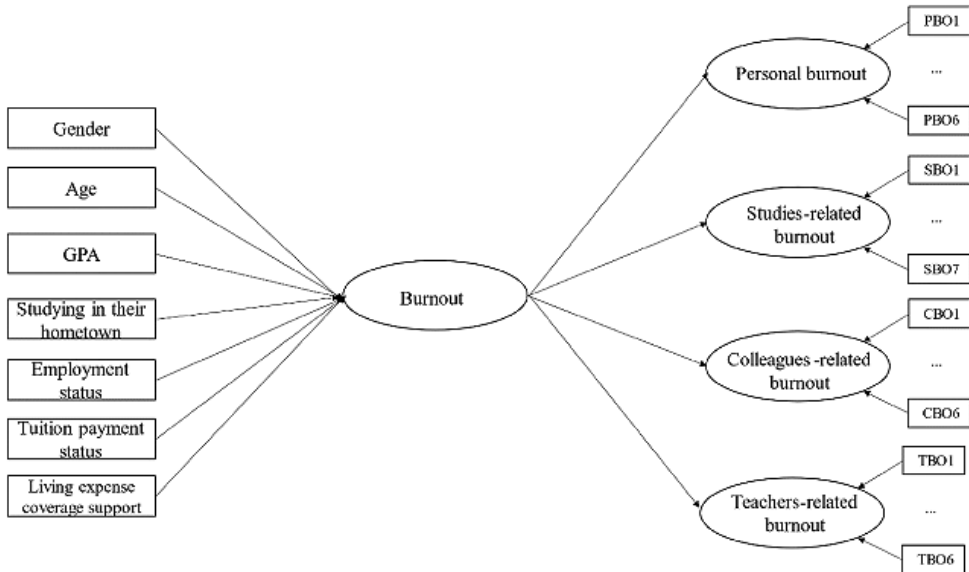
Source: Author's calculations

The initial model had a solid fit to the data (Chi-square = 890.194, df = 439, p < 0.000, RMSEA 0.037, CFI = 0.958, TLI = 0.983, SRMR= 0.049). As in the first model, all paths between predictors and dependent constructs (burnout) that were not statistically significant were removed from the model. The final model fit is: Chi-square = 855.841, df = 415, p <0.000, RMSEA 0.033, CFI = 0.986, TLI = 0.991, SRMR= 0.048. The values of the CFI and TLI indices are above the 0.9 suggested threshold, the RMSEA is below the 0.05 threshold. The removal of these paths did not impact in any way the model quality as the value of the Chi-square statistics comparison test had the p-value greater than 0.05.

The results of Model 2 showing the statistically significant impacts are presented in Table 3.

Table 3: Results of the Model 2 assessment – constructs, predictors, estimated paths, values of the Z statistics, R square, Cronbach's alfa, and CR

Construct	Predictor	Estimate Std	Z value	P-value	R^2	Cronbach's alfa	CR
Overall burnout	Gender	-0.052	-3.208	0.001	0.046	0.917	0.963
	Age	0.135	7.425	0.001			
	GPA	0.051	2.594	0.009			
	Studying in their hometown	-0.073	-4.719	0.001			
	Tuition payment status	0.154	8.039	0.001			

Source: Author's calculations

5. Discussion

Our study indicates that 26.90% of students experience overall burnout. This figure surpasses the findings regarding Millennial generation students, such as those showing that 17% of them experienced burnout (Campos et al., 2012), as well as the more recent findings by Wing et al. (2018), indicating a 20.1% burnout rate among Generation Z non-medical students. However, the percentage is, as expected, lower if compared to medical students' burnout, with an average prevalence of around 50% (Gilbey et al., 2023). On the other hand, the study shows that an alarming 63.2% of students experience personal and 44.3% experience studies-related burnout. These levels are the same as Serbian students' burnout levels measured during the COVID-19 pandemic when the learning was conducted within the emergency online environment (Ivančević et al., 2023a), signalling that burnout is not connected merely with the characteristics of the learning environment but other factors as well.

Hypothesis 1 has been partially confirmed. Female students report significantly higher levels of overall burnout, personal and studies-related burnout, whereas male students are more prone to teachers-related burnout.

The findings regarding students' overall, studies-related as well as personal burnout which encapsulates a general feeling of exhaustion, irrespective of any specific source of stress, align with those of Spataro et al. (2016) and Miltojević et al. (2021). Such results might be attributed to higher levels of internalized problems in female students (Walburg, 2014), their greater fear of failing academically, and their orientation toward emotion-oriented coping strategies (Meléndez et al., 2012), all of which cause increased stress levels and subsequent exhaustion. Finally, women's greater use of self-blame as a maladaptive coping strategy can also contribute to higher rates of exhaustion and burnout (Spataro et al., 2016).

The discovery that male students experience higher burnout from interactions with teachers contrasts with Backović et al.'s (2012) findings of increased stress among females in similar encounters. However, it aligns with the findings of Chuming et al.'s (2017) meta-analysis on medical students' burnout, showing that male students experience higher levels of it, partly due to strained relationships in the educational environment. It should be noted that one of the key roles of academic staff is to provide social support to students, which, if lacking, significantly increases student burnout (Ivančević et al., 2023b). On the other hand, research indicates that female students utilize social support more effectively (Meléndez et al., 2012), while male students tend to hinder their ability to express their challenges openly and seek support (Khairaniet al., 2020), which in turn may increase feelings of disappointment and alienation, and lead to burnout. Finally, the traditional teaching methods may favour female learning styles, additionally challenging male students' attitudes towards teaching staff, potentially leading to burnout.

Hypothesis 2 has been confirmed. The levels of students' overall burnout are shown to increase with age, as well as their personal, studies-related, colleagues-related, and teachers-related burnout levels. The finding aligns with those of Dyrbye et al. (2006) as well as Galán et al. (2011) targeting the Millennial generation but contrasts with the results of a recent study on Gen Z students, by Fernández-Castillo and Fernández-Prados (2022). This might suggest that the connection between age and burnout does not depend on generational characteristics but on other factors.

On the one hand, students' academic demands and responsibilities increase with the years and heightened workloads and more complex tasks can contribute to students' exhaustion levels (Jacob and Dodd, 2003), increasing their studies-related as well as personal and overall burnout levels. On the other hand, the rise in colleagues-related and teachers-related burnout levels implies that the social dynamics within the academic environment increases student burnout as they advance in their studies. This can be explained by the bidirectional nature of the burnout-communication relationship. In the beginning, insufficient, inadequate, and low-quality communication with their peers and academic staff may increase students' stress and foster feelings of loneliness, and not being understood, and appreciated, eventually resulting in burnout (Ivančević et al., 2023b). Once developed, burnout can impair individuals' communication skills and exacerbate depersonalization, leading to increased isolation or interpersonal conflicts (Maslach et al., 2001). In this way, the vicious circle of burnout is formed, with its levels increasing with age. This finding is important as, apart from the increased academic demands, it recognizes the impact of relational dynamics on university social sustainability, indicating that monitoring of communication quality within the academic environment, and providing students with timely social support are needed.

Hypothesis 3 has been partially confirmed. The results show that students' GPA is positively connected to student overall and colleagues-related burnout, while it is

negativelyconnected to their teachers-related burnout. The findings are complex and only partially in line with those regarding the Millennial generation (Jacobs and Dodd, 2003), possibly due to a combination of factors.

The connection between students' higher academic achievement and their overall burnout, that it is their overall experience of exhaustion, is in line with Velasco's (2019) findings regarding male students at Filipino Universities. One of the reasons might be that Generation Z members are depicted as self-learners who demonstrate a greater inclination to acquire knowledge online rather than in traditional educational environments (Francis and Hoefel, 2018). As traditional classrooms were designed for generations of digital immigrants, learning in them requires more energy and adjustments from digital natives, gradually exhausting them and potentially leading to burnout. Moreover, Generation Z students tend to approach institutions with a more pragmatic and analytical mindset, and they also prioritize personal values and causes over traditional measures of success (Francis and Hoefel, 2018). Hence, striving for a higher GPA, a traditional measure of success, may not align with their authentic values. This mismatch can lead to increased exhaustion, which can ultimately harm their overall health. Finally, the focus on maintaining a high GPA negatively affects students' relationships with their peers. These interactions can become time-consuming and exhausting, additionally contributing to burnout occurrence.

The only positive outcome of higher GPA burnout-wise is found to be regarding teachers-related burnout, indicating the improved quality of students' relationships with academic staff caused by better achievement. The finding might be expected as teachers commonly tend to develop more positive relationships with students who excel academically, providing them with affirming feedback and encouragement. This can enhance a sense of mutual respect and trust, which can in turn generate a more supportive environment acting as a buffer against burnout (Ivančević et al., 2023b).

Hypothesis 4 has been partially confirmed. Results show thatstudents who are not employed have higher studies-related burnout, whereas other burnout dimensions as well as student overall burnout are not significantly connected to students' employment. This result is in contrast with findings regarding the Millennial generation, which indicated that employment significantly raises student burnout levels (Dyrbye et al., 2008). However, it is mostly in line with the recent study by Fiorilli et al. (2022) showing no difference in burnout levels between employed and non-employed students.

The beneficial effect of employment on studies-related burnout can be explained by various factors. Firstly, there are data showing that working can provide students with discipline and structure, and more efficient use of the time they dedicate to studying as well as less procrastination (Dundesand Marx, 2006), which can lead to greater overall resilience, better health, and satisfaction. Moreover, employment can equip students with the financial means to engage in activities such as hobbies, recreation,

and travel that may alleviate burnout and are often unavailable to non-working students (Thibaut et al., 2017), compensating for the potential drawbacks of being employed. More importantly, employment can enable studentsto pay their tuition fees. In contrast, students who do not work may additionally worry about financing their studies, and the increased financial strain may impede their focus and concentration, making the process of learning more difficult for them and leading to burnout. Lastly, raised during the global economic turmoil, Generation Z is less idealistic than the Millennial generation, valuing financial stability and looking for employment at a younger age than their predecessors (Francis and Hoefel, 2018). Therefore, having a job is not perceived as a burden but as a privilege which, according to this finding, does not cause additional stress that would increase Gen Z students' burnout levels.

Hypothesis 5 has been partially confirmed. Self-financed students are found to experience higher overall burnout.

This finding reaffirms earlier research indicating that paying tuition is one of the most significant stressors for students (Mccullough, 2022). Tuition fees are frequently high nowadays, and students struggle to find financial resources to cover these costs. Relying on their parents' financial support can put additional pressure on them to justify the investment and excel academically, which can, in turn, lead to burnout (Mccullough, 2022). Alternatively, they can rely on loans but concerns about debt repayment along with interest rates are also shown to contribute to students' health and raise the risk of burnout development (Garrett et al., 2022). Finally, some students work to finance their expensive education. On the one hand, it may decrease their financial stress, and, as previously explained, is not jeopardizing *per se*. However, if their earnings are insufficient to pay the entire tuition fee, let alone afford leisure and other activities, it may increase their frustration and contribute to burnout. Therefore, introducing support mechanisms for students who self-finance their studies is necessary for burnout mitigation and the promotion of students' well-being.

*Hypothesis 6*has been rejected. The results show no statistically significant difference regarding student overall burnout as well as separate burnout dimensions, between students who are and who are not financially supported by their parents. The results are in contrast with Mccullough's (2022) observation that students responsible for covering their living expenses often struggle.

Even though this finding might seem counter-intuitive, it can be explained by several reasons. Firstly, students who are not financially supported by their parents may support themselves through employment, and as shown herein, employment does not generate burnout among Generation Z students, on the contrary. In addition, some students may support themselves through other means, including scholarships, which can mitigate any potential impact of not receiving parental financial support. Moreover, financial independence gained in such ways is appreciated by the members of

this generation (Francis and Hoefel, 2018). Finally, it is also important to emphasize that the lifestyle and purchasing habits of Generation Z differ from those of former generations in that they are found to make more responsible and rational decisions (Seyfi et al., 2023).If these are coupled with Generation Z members' overall inclination towards sustainable behaviour (Dabija et al., 2020), they might influence the adoption of more modest living arrangements and the reduction of unnecessary living expenses, which may, in turn, alleviate their overall financial burden.

All in all, this research has revealed that tuition fees present the greatest financial challenge for Gen Z students leading to increased overall burnout levels. In contrast, covering their own living expenses is not identified as a significant threat to students' health.

Hypothesis 7 has been confirmed. The students who do not study in their hometown are shown to have higher overall burnout, as well as their personal, studies-related, and teachers-related burnout. The insight is in line with limited prior findings showing that students screened for burnout typically live away from their families (Talih et al., 2018). This might be the consequence of several factors.

Firstly, studying away from their hometown can deprive students of their primary support networks, which typically include family and close friends. Without adequate social support, they might feel isolated and disconnected, and thus more susceptible to burnout (Maslach et al., 2001). In addition, they face challenges connected to adapting to a new environment (Yang and Farn, 2005) which can be often coupled with the responsibility of living alone for the first time, both contributing to their increased levels of stress and burnout. They might also feel additional pressure to excel academically and justify their families' investments and expectations (Adams et al., 2016). Therefore, these students may need additional support from the faculty, and if such a need is not recognized and fulfilled, burnout levels can rise.

6. Conclusions

As academic burnout negatively affects the social sustainability of universities, this study aimed to examine burnout prevalence among Generation Z students and identify associated risk factors through seven proposed hypotheses.

The findings indicate that a quarter of the examined students experience overall burnout with around 60% and 45% of them experiencing personal and studies-related burnout respectively. These alarming figures emphasize that university management and policymakers should develop interventions aimed at preventing student burnout and fostering resilience. In addition, five hypotheses connected to burnout risk factors have been fully or partially confirmed, showing that Generation Z students' burnout is significantly connected to students' gender, age, GPA, tuition payment status, and the

fact that they do or do not study in their hometown. On the other hand, two hypotheses have been rejected showing that Gen Z students' employment as well as their living expense coverage do not increase their burnout. These findings contradict the majority of findings connected to Millennial and Generation X students and present important contributions of the study. They indicate that managing their costs of living is not as stressful to this generation of students as it was to the previous ones and that they can work and study simultaneously without additionally deteriorating their health. These findings are also insightful as they reflect the economic stability of the Gen Z student population, which can only positively contribute to the sustainability of the future workforce.

According to the findings of the study, several practical implications for university management and policymakers can be offered. Firstly, as burnout is shown to be significantly connected to gender, age, GPA, and whether students study in their hometown, implementing tailored interventions can be suggested. For instance, gender- and age-specific programs can be developed to address the unique stressors different student groups face. Additionally, specialized support systems including academic counselling and the provision of stress management resources perhaps via online platforms should be at the disposal to students aiming for high academic achievement. Also, academic staff should be instructed to provide additional support to students studying away from their hometowns, to help them adapt to new environments.

Secondly, the increased levels of relational burnout dimensions signalize the need for improving communication and fostering peer connections within university settings. Universities should create more opportunities for collaborative activities, and mentorship programs, and organize social events that would promote a sense of community and reduce students' isolation. Thirdly, as one of the identified burnout risk factors is financial stress related to tuition fees, policymakers should introduce strategies to make education more affordable, including offering more scholarships, financial aid, and more flexible payment plans. Addressing the burden of high tuition fees could significantly reduce stress and prevent burnout occurrence.

Finally, universities should consider integrating well-being programs into their broader institutional approach to students. These programs should include regular assessments of student burnout levels, lectures on burnout and other health problems, as well as making mental health services more accessible. This would increase awareness of burnout, reduce the stigma of mental health issues, and foster a more supportive and sustainable educational environment for Generation Z students.

The study is not without limitations. The first limitation includes a sample bias towards technical and technological sciences, as students in other academic disciplines face different stressors throughout their higher education. For instance, medical students frequently interact with patients during their studies, which has been shown to contribute to higher burnout levels. As a result, these findings may

354
Sonja Ivančević et al. • Academic burnout of digital natives and social sustainability...
Zb. rad. Ekon. fak. Rij. • 2024 • Vol. 42 • No. 2 • 333–360

not fully reflect the experiences of students in non-technical fields. Second, the sample is limited to students from a single university, which may also affect the generalizability of the findings. The results may not apply to students at institutions with different academic environments, or resources. Additionally, the findings may be specific to the culture in which the study was conducted and may not be applicable to societies where different educational and cultural norms and practices have been in place for a longer time. Lastly, the study's cross-sectional design, which assesses the situation at a single point in time, limits the ability to draw causal conclusions.

Based on these limitations, we offer several recommendations for future research. First, we suggest conducting a longitudinal investigation to track students' burnout progression from freshman year to graduation. This approach would provide valuable insights into how burnout develops over time. Also, we recommend comparative studies across academic disciplines or cultural contexts. Such studies would expand the scope of the research and offer a deeper understanding of burnout variability among Generation Z students in diverse environments.

Acknowledgement

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360

Sonja Ivančević et al. • Academic burnout of digital natives and social sustainability...
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Akademsko sagorijevanje digitalnih domorodaca i socijalna održivost: prevalencija i čimbenici rizika

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Sažetak

Budući da sveučilišta imaju ključnu ulogu u postavljanju temelja za održivu i otpornu radnu snagu, njihova je odgovornost stvoriti okruženje u kojem će se očuvati opća dobrobit studenata. U tom smislu, suvremena sveučilišta susreću se sa značajnim izazovom – sve većom prisutnošću akademskog sindroma sagorijevanja koji negativno utječe na zdravlje studenata, njihovu spremnost na karijeru i budući radni učinak. Dok su se prethodne studije o sagorijevanju većinom fokusirale na studente Milenijalce, ova studija ima za cilj ispitati prevalenciju sagorijevanja i faktore rizika među generacijom Z, prvom generacijom pravih digitalnih domorodaca. Stoga, ova studija predlaže konceptualni model koji istražuje utjecaje sedam pozadinskih (demografskih i situacijskih) čimbenika na četiri dimenzije akademskog sagorijevanja, kao i ukupno sagorijevanja studenata. Model je testiran na uzorku studenata iz Srbije, koristeći analizu modeliranja strukturnih jednadžbi (SEM). Rezultati pokazuju da četvrtina ispitanih studenata doživljava ukupno sagorijevanje, dok preko 60% navodi da je doživjelo određeni stupanj osobnog sagorijevanja. Nadalje, dvije potvrđene hipoteze otkrivaju da je akademski sagorijevanje Generacije Z značajno povezano s dobi i time studiraju li studenti u svom rodnom gradu. Tri djelomično potvrđene hipoteze sugeriraju da su određene dimenzije akademskog sagorijevanja također povezane s spolom, prosječnom ocjenom i plaćanjem školarine.

***Ključne riječi**: Akademsko sagorijevanje, pozadinski čimbenici, digitalni domoroci, održivost, prethodnici izgaranja povezani s financijama*

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