The Effects of High Energy Costs on International Students' Academic Performance – A Cross-Sectional Survey at the University of the West of Scotland

Precious C. Onyenweaku[1], Bla Josee Charlotte Eba[2], Desmond A. Zaki[3*]

[1,2]School of Business and Creative Industries University of the West of Scotland Paisley, PA1 2BE, United Kingdom

[3]Department of Physiotherapy, Faculty of Allied Medical Sciences, Federal University, Wukari, Nigeria

[*]Corresponding author

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ABSTRACT

This quantitative study investigates the profound effects of rising energy costs on the academic experiences of international students in Scotland. While prior research has explored financial challenges faced by students, this study delves deeper, shedding light on how escalating energy costs lead to academic compromises. Through a combination of regression analysis, ANOVA, and correlation analysis, the study reveals a complex relationship between energy costs and academic performance. Notably, it highlights that age and geographical origin moderate the impact of financial adversities, with older students exhibiting greater resilience and African students facing pronounced academic challenges. The research also identifies a strong correlation between increased energy costs and academic setbacks, such as missing assessment deadlines and failing grades. Furthermore, the study uncovers a concerning trend as international students are increasingly eschewing extracurricular activities due to mounting energy costs. These findings have significant implications for student welfare and academic performance and necessitate tailored support mechanisms, financial aid systems, and academic flexibility. The paper calls for proactive, strategic, and holistic interventions to address these challenges and ensure an inclusive global education for international students in the face of adverse economic pressures.

Keywords: Energy costs, Academic performance, international students, Academic experience.

INTRODUCTION

The rising cost of energy is an issue of global concern, impacting various aspects of modern life, from household budgets to environmental sustainability. Amidst this global challenge, international students pursuing higher education in foreign countries face a unique set of obstacles. In the heart of this issue lies a critical question: How do escalating energy costs affect the academic performance and overall educational experience of international students? This quantitative study explored the multifaceted implications of rising energy costs on international students' academic journeys, focusing on a specific context - Scotland. While past research has indeed examined the financial challenges that both domestic and international students encounter during their educational pursuits, this study sought to provide a deeper understanding of the specific compromises international students make in the face of soaring energy expenses (Li et al., 2022; Martis Kainen et al., 2021; Onyenweaku and Eba, 2024).

The research sought to address three key questions: How do rising energy costs affect the academic performance of international students in Scotland? Do demographic factors, such as age and continent of origin, moderate the impact of these costs on academic outcomes? Is there a correlation between rising energy costs and academic setbacks, such as missed deadlines, failing grades, and reduced participation in extracurricular activities? By answering these questions, the study aims to provide valuable insights into the challenges faced by international students and the broader implications of energy cost increases on their educational experiences.

Admittedly, other nonfinancial challenges of international students have been well-documented, ranging from cultural assimilation to adjusting to pedagogical differences (Khanal and Gaulee, 2019). Several studies have also explored the determinants of academic success including, the role of extracurricular engagements (Ribeiro et al., 2023), part-time employment and its interplay with academic life (Broadbridge and Swanson, 2005), and the impacts of digital tools on student productivity (Mei, 2016). Yet, there exists a conspicuous absence of discourse on how energy prices modulate the academic performances of international students. Our research delved into this topic by utilising various statistical analytical methods such as regression analysis, ANOVA, and correlation analysis. These methods allowed us to discern the intricate relationships between energy costs and academic performance, as well as the additional challenges international students encounter. Through these analyses, we shed light on the ways in which energy costs may indirectly influence academic performance when considered alongside demographic and socio-economic factors, such as age and continent of origin.

The implications of this study reach beyond Scotland's borders and carry relevance for international students worldwide. The findings emphasized the need for tailored support mechanisms, financial aid systems, and academic flexibility to help international students cope with the financial repercussions of mounting energy costs. As higher education institutions and policymakers consider these insights, they can work toward ensuring an equitable academic experience for all students, regardless of their backgrounds and the economic pressures they face. This paper, therefore, serves as an essential contribution to the ongoing dialogue about the challenges international students encounter in their pursuit of higher education, while also highlighting the urgency of proactive interventions to ensure their success amidst the global concern of rising energy costs.

LITERATURE REVIEW

The literature underscores the complex challenges that international students encounter as they navigate through higher education abroad. The combination of financial constraints, socio-cultural adaptation, and academic pressures creates a unique set of circumstances that can significantly impact their overall well-being and academic success. The rising costs of living, particularly in relation to household energy, emerges as a pivotal factor that can exacerbate these challenges. The following thematic review discusses the intricate relationship between rising energy costs and the academic experiences of students as available in the literature.

Effects of Economic Burden on Student Life

The financial burden associated with rising energy costs can have a cascading effect on international students' lives. As Onyenweaku and Eba (2024) observed, these students often adopt proactive energy-saving practices, such as curtailing energy use and investing in energy-efficient appliances, in response to the economic strain. The literature further suggests that the financial pressures extend beyond energy conservation, potentially influencing students' consumption patterns and purchasing decisions (Auf et al., 2018). The necessity to allocate a larger portion of their limited budgets to cover energy expenses may lead to trade-offs in other essential areas, such as food, accommodation, and transportation. The resulting financial strain can create a pervasive sense of anxiety and insecurity, impacting students' overall well-being and academic focus. The Guardian's (2023) report of students at top universities considering dropping out due to the cost-of-living crisis further underscores the severity of the situation.

Furthermore, the financial strain experienced by international students can also impact their access to essential resources and opportunities that contribute to their academic success and overall well-being. For instance, the ability to afford textbooks, participate in extracurricular activities, and access adequate healthcare can be significantly impacted by the rising cost of living. These limitations can create additional barriers to academic achievement and social integration, further exacerbating the challenges faced by international students.

The economic burden can also compel students to take on additional work to supplement their income, potentially compromising their academic commitments. The need to balance part-time employment with studies can result in increased absenteeism, which has been linked to lower academic performance (Teixeira, 2016). As Applegate and Daly (2006) highlighted, the impact of paid work on academic performance is a complex issue, with potential benefits and drawbacks depending on the nature and extent of the employment. However, for international students already grappling with the challenges of adapting to a new environment and academic

system, the additional burden of part-time work can be particularly detrimental. The literature suggests that the time and energy devoted to employment can detract from students' ability to fully engage with their studies, leading to decreased academic performance and potentially jeopardising their overall academic success. Broadbridge and Swanson (2005) further elaborate on this, stating that term-time employment can significantly impact students' adjustment to university life, potentially leading to anxiety and depressive feelings.

Furthermore, the financial strain experienced by international students can also impact their access to essential resources and opportunities that contribute to their academic success and overall well-being. For instance, the ability to afford textbooks, access transportation to school, participate in extracurricular activities, and access adequate healthcare can be significantly impacted by the rising cost of living. Srinisha et al. (2018) echo this sentiment, highlighting the adverse effects of economic crises on the academic performance of students. Hence, these limitations create additional barriers to academic achievement and social integration, further exacerbating the challenges faced by international students.

Role of Extracurricular Activities in Fostering Student Success

While the literature highlights the challenges faced by international students, it also emphasizes the potential positive impact of extracurricular activities on their overall well-being and academic success. Active participation in extracurricular activities can foster social integration, enhance personal development, and contribute to a sense of belonging (Guilmette et al., 2019; Ribeiro et al., 2023). These activities provide opportunities for students to interact with their peers, develop new skills, and build a sense of community within the university environment.

However, the rising cost of energy can create barriers to participation in extracurricular activities for international students. As noted by Ribeiro et al. (2023) the financial burden associated with transportation, equipment, and other associated costs can limit their ability to engage in these activities, potentially hindering their social integration and overall well-being. Institutions can play a crucial role in mitigating these challenges by providing financial assistance, offering a range of affordable extracurricular options, and promoting a culture of inclusivity that encourages participation from all students, regardless of their financial circumstances. This research aims to ascertain the influence of rising energy bills on students' extracurricular engagements.

Importance of Attendance and Engagement in Academic Success

The pivotal role of consistent class attendance in academic success is well-established in the literature, particularly for international students navigating the complexities of a new educational environment. Paisey and Paisey (2004) highlight the direct correlation between attendance and academic performance, emphasizing that regular engagement with the learning process fosters a strong knowledge base and facilitates timely feedback from instructors. However, the unique challenges faced by international students, including financial constraints necessitating part-time employment, the complexities of socio-cultural adaptation, and potential language barriers, can create obstacles to consistent attendance.

The literature underscores the necessity for institutions to adopt a proactive approach in addressing the underlying factors contributing to absenteeism among international students. The provision of flexible learning options, such as online or hybrid courses, can accommodate students' diverse needs and schedules, particularly those balancing academic commitments with part-time work. Additionally, offering robust academic support services, including tutoring, language assistance, and study skills workshops, can empower students to overcome academic challenges and enhance their engagement with the learning process. The creation of a welcoming and inclusive learning environment that fosters a sense of belonging and community can further encourage active participation and reduce the likelihood of absenteeism. As Wentzel and Wigfield (1998) suggest, positive teacher-student relationships and a supportive classroom climate can significantly contribute to students' motivation and engagement, ultimately promoting academic success. Thus, any impact on students' engagement and attendance has a huge potential in impacting their academic performance.

Post-COVID Pressure on Energy Consumption

The COVID-19 pandemic has ushered in an era of unprecedented change and uncertainty in higher education,

with a significant shift towards virtual learning and increased reliance on technology. While these changes have presented challenges for all students, international students may face additional hurdles in adapting to online learning environments and navigating the complexities of remote communication and collaboration. The literature highlights the need for institutions to provide adequate technological support and training to ensure that international students can fully participate in online learning and access the resources they need to succeed.

Admittedly, the pandemic has underscored the importance of digital literacy and technological competence in the 21st-century workforce. As Vu et al. (2022) note, international students may face challenges in work-integrated learning due to language barriers, cultural differences, and limited access to professional networks. The integration of technology into higher education can provide opportunities for international students to develop the digital skills and competencies necessary for success in the global marketplace. However, the increased reliance on technology in the post-COVID era has also led to a surge in energy consumption. The need for reliable internet connectivity, prolonged use of electronic devices, and the energy demands of online learning platforms can place additional pressure on international students already grappling with the rising cost of energy. The transition to online learning has also necessitated increased energy use for purposes such as reliable internet connectivity, prolonged use of electronic devices, and the energy demands of online learning platforms. The resulting financial strain can disproportionately affect international students, who may have limited financial resources and different learning styles (Rivas et al., 2021).

THEORETICAL FRAMEWORK

Maslow's Hierarchy of Needs forms the theoretical framework in exploring the intricate balance between energy-economic pressures and academic achievement among international students. This framework provides an invaluable perspective on how international students in Scotland might navigate the challenging environment in the face of increased energy costs. Abraham Maslow in his seminal work offers a stratified model that details the progression of human needs from basic physiological requisites to the pinnacle of self-actualisation (Rojas et al., 2023). While originally a psychological construct, it seamlessly integrates with economic thinking. Essentially, if one level (energy needs) remains unfulfilled it becomes almost impossible to focus on the other (academic) needs. In an economic twist, these layers resemble the tough choices consumers (in this case students) make when budgeting. With rising energy costs, the dilemma becomes more pronounced, pushing basic needs like warmth and security to the forefront of students' minds at the expense of academic investments and commitment.

Unarguably, the rising energy costs, influenced by geopolitical tensions like the Russian-Ukraine scenario (Mbah and Wasum, 2022) and highlighted by shifts in sectors such as logistics (Wehner, 2018; Martiskainen et al., 2021), undeniably pinch the pockets of international students. As these students spend more on basic needs, their resources for academic commitments might stretch thin. Basic needs based on Maslow, come before all else. If students constantly grapple with such foundational concerns, their academic activities might take a backseat. Established studies link positive academic outcomes with consistent class attendance (Paisey and Paisey, 2004), timely resource acquisition (Applegate and Daly, 2006), and active academic involvement (Freeman et al., 2014). But with tightened budgets, students might skip classes, avoid buying essential academic materials, or even reduce their involvement in enriching extracurricular activities (Ribeiro et al., 2023).

Summarily, despite the vast literature addressing the economic impacts of rising energy costs on various sectors, an apparent void emerges when examining its effects on academic performance, especially amongst international students. Most studies focused primarily on direct economic sectors, with discussions on logistics (Wehner, 2018), consumer behaviour (Punzi, 2019), or geopolitical dynamics like the Russian-Ukraine tensions (Mbah and Wasum, 2022). Yet, the trickle-down effects on individual international students, an integral part of the global academic community, remains underexplored. Even when considering studies on academic success factors such as attendance (Paisey and Paisey, 2004) and participation in extracurricular activities (Ribeiro et al., 2023), the specific impact of energy costs as an external stressor is seldom addressed. Within the research on academic achievement determinants, there is an observable (but surprising) absence of focused inquiries that address the relationship between economic pressures of rising energy prices on academic performance of international students. Therefore, this research aims to fill this literary gap by investigating how energy costs influence academic performance of international students in Scotland. Thus, the study hopes to provide actionable insights

for educators, universities, policymakers, and students themselves.

METHODOLOGY

As earlier stated, this study explored the relationship between energy costs and the academic performance of international students situated in Scotland. So, we employed a cross-sectional research design, a methodology lauded for its adeptness in examining real-time socio-economic situations especially those associated with fluctuating energy costs (Bryman, 2016; Saunders et al., 2019). Based on the positivism philosophy, the study's approach endeavoured to produce an objective and quantifiable assessment of the socio-economic variables affecting student outcomes, particularly in light of energy-related financial strains (Rafiq et al., 2022). Briones et al. (2022) alluded to the practical value of quantitative data collection methods in obtaining accurate data on students' academic performances and response to changing socio-economic parameters. This method aligns with the research's deductive approach unlike the subjective qualitative data collection method. Similarly, Saunders et al. (2019) highlighted the efficacy of structured questionnaires in collecting precise data. Building on this insight, structured questionnaires were employed for data collection and in ensuring accurate capture of student sentiments.

However, convenience sampling was deemed the most effective approach in accessing data from the international student community throughout Scotland. The questionnaire was administered electronically via Microsoft Forms and distributed to international students through various channels, including university emails, social media groups, and academic forums. This convenience sampling approach was deemed the most effective method for accessing data from the international student community in Scotland. A total of 220 participants were contacted via Microsoft Forms, however, only 176 valid responses qualified for inclusion in the final analysis. The analytical tool used in this inquiry was IBM SPSS version 24 for its accuracy and quality of result outputs. Descriptive statistics provided an initial insight, while more intricate associations related to energy costs and academic outcomes were discerned through inferential statistics of regression analysis.

For instance, regression analysis was used to assess the association between rising energy costs and academic performance among international students, allowing for the control of demographic variables such as age groups and continent of origin. Similarly, Analysis of Variance (ANOVA) was conducted to discern and revalidate the association between academic performance adversity and continent of origin in the face of changing energy prices. Furthermore, Spearman's correlation coefficient was used to assess the correlation between rising energy costs, and missed assessment deadlines and course failures. Notably, the commitment to methodological rigor was validated by the reliability of the utilised Likert-type scales, which achieved a coefficient (α) of 0.86. This high reliability score, mirroring the findings of Fields (2013), stands as a testament to the robustness and consistency of the research instruments and methodologies employed. Also, the integrity of data handling was fortified through stringent confidentiality measures, aligning with best research practices (Bryman, Bell, and Harley, 2019).

RESULTS AND FINDINGS

Impacts of Rising Energy Costs on International Students' Academic Performance

The data in this research offers an in-depth understanding of how rising energy costs impact the academic endeavours of international students in Scotland. As revealed in Table 1, the majority of international students have made significant changes to their academic routines due to energy costs. Specifically, 46.59% of respondents have often cancelled trips to the library, 53.41% have missed classes, 43.75% have foregone non-academic events, and a striking 61.87% have been distracted during personal study sessions. Additionally, 50.37% have postponed personal reading and study to manage energy-related expenses more efficiently. Yet, even amidst these challenges, 60.22% of respondents occasionally or consistently purchased essential academic materials, signalling the tenacity and determination of these students to prioritise their academic pursuits. An overwhelming 86.71% recognised the potential detrimental effects of ongoing high energy costs on their academic performance. Furthermore, the mean academic performance adversity score, which stood at 18.84 (with a standard deviation of 5.09), depicted a diverse range of impacts, from low (37.14%) to high (32.57%).

Table 1: Items Used in Creating Academic Performance Adversity Related Score

Energy-induced impacts on academics	Level of energy price-induced effects				
	Very high %	High %	Moderate %	Low %	Very low %
Cancellation of library trips for reading and borrowing academic books	46.59	18.18	18.75	11.93	4.55
Energy-induced absenteeism from school	53.41	25.00	15.34	3.98	2.27
Absenteeism from extracurricular activities	43.75	18.75	16.48	14.20	6.82
Purchase of books and other academic materials	32.95	27.27	27.84	9.66	2.27
Energy anxiety-induced academic distraction	25.00	13.64	47.73	3.41	10.23
Postponement of personal reading/study	14.77	25.57	35.80	14.77	9.09
Potential of adverse academic effects - missing assessment submission deadlines or even fail some courses	57.14	29.14	10.86	2.29	0.57
Academic performance adversity related score (Range: 9 - 35)	Mean = 18.84 (SD = 5.09)				
Low	37.14%				
Medium	30.29%				
High	32.57%				

However, the implications of these findings are profound. They not only echo prior research that explored financial challenges of students – both domestic and international (MacFarlane, 2018; Testa et al., 2016), but also contribute novel insights into the specific academic compromises made in the face of soaring energy costs. For instance, the resilience of international students, even in economically demanding circumstances was evident in this study (Duff et al., 2004; Yu et al., 2023). Moreover, while international students' commitment to acquiring essential academic resources remained unwavering, the reality of missed classes, curtailed library visits, and study distractions underscores the urgency of addressing the broader socio-economic influences on academic performance. Therefore, this research provides a foundational basis for subsequent discussions on tailored support mechanisms, financial aid systems, and academic flexibility for international students grappling with the financial repercussions of escalating energy costs.

Furthermore, previous researchers have consistently highlighted the positive influence of extracurricular activities on academic achievement (Freeman, 2017; Wang and Shiveley, 2009). However, this study's findings present a disconcerting shift caused by rising energy costs. To navigate these financial strains, international students are reshuffling their academic priorities, sometimes side-lining crucial study-related activities. This deviation not only disrupts traditional educational paradigms but also raises concerns about their academic future. With extracurricular activities sacrificed for other competing needs and energy costs concerns, international students could put their academic endeavour to enormous disadvantage. Also, this could imply missing out of opportunities for acculturation, academic brainstorming and friendship which fosters improved resilience and grades.

On the other hand, several scholars have emphasized the negative implications of class absenteeism on learning outcomes (Teixeira, 2016; Applegate and Daly, 2006). Alarmingly, this study pinpoints a 53.41% absenteeism rate among international students as a result of the challenges posed by high energy tariffs. As students grapple with the high costs of energy and its accruing effects in the costs of transportation and food, they seem to prioritise other needs over regular class attendance. Teixeira (2016) opined that absenteeism and reduction in

academic activities predisposes students to lower grades and reduced academic achievement. Therefore, this figure is not a mere statistic, but an urgent indicator of potential academic challenges faced by this demographic. Additionally, the current scenario proves that international students are clearly being influenced by external economic factors, specifically the rising energy costs. Hence, there is a pressing need for academic institutions and policymakers to design interventions, ensuring students can remain resilient and academically successful despite such external economic pressures.

Association Between High Energy Tariffs and Academic Performance Adversities Among International Students

A regression analysis was conducted to assess the association between rising energy costs and academic performance among international students. Initially, without considering demographic factors, the analysis yielded a p-value of 0.227, indicating no significant relationship between rising energy costs and academic performance. However, upon adjusting for demographic variables such as age group and continent of origin in the first adjusted model, a noteworthy shift occurred. It was found that students in the age groups of 25-34, 35-44, and 45-54 exhibited significantly higher academic performance scores, with increases ranging from 4 to 6 compared to the reference group (age 18-24). Additionally, international students from Africa displayed significantly higher academic performance adversity scores by 4.3 (p-value=0.02) compared to students from other continents after controlling for rising energy costs. Indeed, the findings from this study suggest that rising energy costs may not exert a direct and independent influence on academic performance among international students. Instead, when considered alongside demographic and other socio-economic factors, such as age group and continent of origin, they appear to play a more significant role in shaping academic outcomes. Thus, this perspective underscores the complexity of the relationship between energy costs and academic performance, emphasising the need for a holistic understanding that considers multiple factors influencing students' educational experiences.

Therefore, one could logically deduce that elevated financial burdens from rising energy costs would negatively impact academic engagement. Yet, this direct linkage seems missing at first glance. However, an in-depth examination of the data, factoring in demographic characteristics brings clarity to the data. The increased performance of students within the 25-34, 35-44, and 45-54 age groups aligns with previous studies suggesting a maturation effect on academic success. This could be attributed to older students having cultivated resilience, better time management, and a focused academic perspective over time. Sheard (2009) noted that mature-age students had higher resilience, commitment and academic performance than younger university students. Similarly, Rani (2014) observed that age plays a crucial role in energy curtailment and energy consumption pattern. Understandably, younger students with lower curtailment approach and youthful exuberance or ‘I-do-not-care’ attitude could record reduced academic scores. Essentially, with age might come a heightened ability to navigate and mitigate challenges, including those posed by rising energy costs and heightened economic hardship (Mbah and Wasum, 2022; Punzi, 2019).

On the other hand, the notably heightened academic challenges of African students invite in-depth exploration. Auf et al. (2018) noted that cultural backgrounds play a pivotal role in shaping consumer behaviour and Rani (2014) opined that cultural factors result in distinctive coping strategies, resilience, and even influence energy consumer behaviour. So, African students, likely shaped by the interplay of socio-economic conditions and intricate cultural landscapes of their origin countries, might inherently be more susceptible to the external economic pressures, such as rising energy costs. This vulnerability could make them more prone to academic disruptions when confronted with financial setbacks. In similar vein, the cross-cultural dynamics observed by Özcan and Bulus (2022) also highlights how individualistic and collectivist cultures produce differing resilience mechanisms in academic realms. African nations, primarily collectivist in their societal fabric, potentially foster a community-based approach to adversity, emphasising shared experiences and collective problem-solving. This could paradoxically make African students more sensitive to financial stresses. Nair et al. (2022) further illustrated this point by noting that during substantial challenges, such as the Covid-19 pandemic, collectivist societies like those in Africa exhibited a particular kind of resilience. However, this culturally infused resilience, deeply anchored in traditions, might be more attuned to communal and health challenges, making economic adversities, like surging energy costs, more pronounced in their impact on the academic pursuits of African students.

Furthermore, analysis of variance (ANOVA) was carried out to discern and revalidate the association between academic performance adversity and continent of origin in the face of changing energy prices. The ANOVA analysis revealed a notable variation in academic adversity arising from these energy costs, with African students standing out as particularly affected. This pronounced adversity among African students as against Asian, European and American students is quantified in the post hoc LSD test (M=2.81, SD=0.75) shown in Table 2. Admittedly, one plausible explanation for the distinct adversity experienced by African students hinges on the geographical and climatic differences. The majority, coming from tropical environments, find the cold Scottish conditions to be a significant contrast. It has been previously postulated by scholars that environmental factors, such as contrasting temperature gradients, can significantly impact academic performance (Srinisha et al., 2018). Therefore, for African students, navigating the added fiscal constraints of spiralling energy costs might inadvertently drive them towards energy conservation measures. This, in turn, could amplify their discomfort, casting a shadow over their academic outcomes.

Table 2: Post HOC Test Showing Academic Performance Adversity Across Various Continents

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Africa	107	2.8140	.75026	.07253	2.6702	2.9578	1.43	5.00
Asia	58	2.5419	.68890	.09046	2.3607	2.7230	1.29	5.00
Other	11	2.2078	.32175	.09701	1.9916	2.4239	1.86	2.86
Total	176	2.6864	.72988	.05502	2.5778	2.7950	1.29	5.00

Moreover, economic forces are undeniably intertwined with academic experiences. Several researchers have discussed the influence of economic determinants like household income and living costs on social, behavioural and other characteristics of the society (Gärling et al., 2018; MacFarlane, 2018; Auf et al., 2018). The economic stability of the various students as well as their household size could predispose them to increased academic hardship. Nonetheless, this fiscal and climatic analysis only scratches the surface. So, further literary review indicates that international students' cultural milieu shapes these observed experiences. Hofstede's (2001) research on cultural dimensions indicates the unique role of national culture in influencing both individual and organisational behaviour globally (Hofstede et al., 2010). So, African societies predominantly characterised by collectivist leanings, might possess distinct coping mechanisms founded on shared community values. This perspective aligns with the findings of Özcan and Bulus (2022), who observed the protective facets intrinsic to resilience in collectivist cultures. In this vein, Lam and Zhou's (2022) meta-analysis of cross-cultural manifestations of grit suggests that attributes like perseverance might manifest differently yet effectively across cultures. However, Clauss-Ehlers (2004) argued that resilience is multifaceted and deeply embedded in cultural traits and amplified differently under varying circumstances. Therefore, while these cultures might nurture resilience, they could simultaneously amplify vulnerabilities in foreign academic terrains, especially when confronted by unforeseen adversities.

Practically speaking, the results underscore the importance of tailoring academic and financial support mechanisms at universities. A 'one-size-fits-all' approach might overlook the intricate interplay of individual demographics and economic pressures. Institutions should be propelled to adopt a multi-faceted approach that addresses rising energy costs directly, while also strengthening support systems that account for the diverse backgrounds and age-related needs of their international student body. Thus, this research serves as a clarion call for policymakers and educational institutions to recognise and respond to these identified challenges in a manner that ensures equitable academic experience for all students.

Effects of Rising Energy Costs on Academic activities and Students' Failing Grades

This research ventured into understanding the multifaceted relationship between rising energy costs and two primary academic outcomes: missed assessment deadlines and course failures. Additionally, the study probed the correlation between these costs and students' participation in extracurricular activities. Utilising Spearman

correlation analysis, a distinct positive correlation emerged between increasing energy costs and the tendency of international students to miss assessment deadlines or fail courses. The data revealed a correlation coefficient (rs) of 0.37, with a highly significant p-value of less than 0.001. Simultaneously, an inverse correlation was identified concerning rising energy costs and students' participation in extracurricular activities, with a correlation coefficient (rs) of -0.21, and a significant p-value of 0.005. This infers that as energy costs mount, international students are increasingly eschewing extracurricular engagements.

The observed correlation between surging energy costs and academic challenges provides invaluable insights into the broader discourse on student welfare and performance. Existing literature underscores the myriad benefits of extracurricular activities in bolstering academic prowess and improving employability prospects (Ribeiro et al., 2023). If increased energy expenditure detracts from engagement in these formative experiences, it could signify a broader systemic issue, wherein financial constraints overshadow holistic educational pursuits. Alternatively, Freeman (2017) opined that the intrinsic value of extracurricular involvements enhances overall academic achievement and has far-reaching impact in fostering healthy mental development among students. The evidence suggesting that energy costs impede this engagement underscores a concerning trend, where students might miss out on the comprehensive benefits encompassing both emotional and academic realms (Wang and Shiveley, 2009; Guilmette et al., 2019). On the other hand, as energy costs rise, students might gravitate towards paid employment opportunities to counteract their financial constraints. Applegate and Daly (2006) previously documented the potential pitfalls of balancing work and study. Indeed, students tend to forgo extracurricular activities and other non-academic essential endeavours as they work longer hours to meet exorbitant energy needs. According to Guilmette et al. (2019) these students are not only affected in their academic achievements but might be ill-positioned for the job market, miss out of vital transferable skills, mentorship and networks.

Furthermore, Rodríguez-Hernández et al. (2020) emphasised that the socio-economic variables at play are formidable influencers of academic success or lack thereof. For international students, navigating unfamiliar energy landscapes, the added fiscal burden might also translate to mental health challenges, potentially catalysing scenarios of burnout and depression—conditions with documented detriments to academic outcomes (Madigan and Curran, 2021; Deroma et al., 2009). No wonder, there is need to investigate these factors more closely with the aim of determining their contributions to academic performance. However, at the core of academic performance are ongoing concerns of educational ethics and integrity. At this juncture, a salient question requiring further consideration is: as international students grapple with these multifarious pressures, might they be more inclined towards avenues like essay mills, as highlighted by Sweeney (2023). Such potential inclinations not only jeopardise individual academic journeys but could erode the broader ethos of academic rigor and integrity. Therefore, there is a need to promptly intervene in addressing energy costs-induced challenges in a fashion that prioritises student welfare and academic integrity.

CONCLUSION

Remarkably, this research has clearly shown that the rising energy costs in Scotland presents international students with significant academic challenges. The data portrays the stark reality; students are adjusting their academic behaviours in response to financial pressures. A significant proportion reported that they often forgo classes, delay personal study sessions, and reduce library engagements. On the other hand, most international students reported that their investment on academic materials was unaffected by the high energy tariffs. While such adaptations highlight students' resilience, they also accentuate the socio-economic barriers obstructing their academic paths. At first glance, the direct link between surging energy expenses and academic performance appeared insignificant. However, an inferential demographic-based analysis indicated that age and geographical origin played significant roles in moderating the impact of these financial adversities on students' academics. Specifically, older students, having fostered a refined resilience over time, appeared better equipped to counter the challenges posed by exorbitant energy costs. Conversely, African students, perhaps influenced by their unique socio-cultural backgrounds and the stark climatic differences between their home countries and Scotland, exhibited pronounced academic challenges.

However, another revelation of the study is the significant relationship between rising energy costs and students' inclination towards extracurricular activities. Given that these activities have been universally acknowledged for

their vital role in fostering academic and holistic growth, this trend is deeply concerning. Additionally, the implication of this finding is not limited to the potential of jeopardising students' immediate academic outcomes, but they might also be sidelining opportunities that bolster personal development and future employability. Furthermore, the research identifies a strong correlation between increased energy costs and academic setbacks, such as missing critical assessment deadlines and failing grades. Thus, beyond the immediate financial impacts, it is evident that these mounting costs also act as external stressors with significant influence on international students' academic performance.

Therefore, the study's examination of the impacts of rising energy costs on the academic experiences of international students in Scotland carries profound implications. However, as with any quantitative enquiry, there are inherent limitations. The use of a cross-sectional approach provides a snapshot of the situation at a specific point in time, without allowing for the exploration of evolving trends or the cause-and-effect dynamics. While this approach offers valuable immediate insights, it may not capture the entirety of the complexities or the long-term impacts. The use of convenient sampling also serves to introduce biases, thereby reducing the generalizability of the findings from this study. Therefore, future research could consider employing more rigorous sampling methods, such as stratified random sampling, to enhance the generalisability of the results. Additionally, the study's geographical confinement to Scotland, although providing rich context-specific data, raises questions about the generalisability of the findings to other international educational settings. Nevertheless, these limitations do not detract from the study's core findings but rather highlight avenues for further research. They emphasize the potential for more longitudinal studies that track these effects over time and the benefit of expanding this research to varied geographical locales to capture a broader spectrum of international student experiences. Such endeavours would further enhance the understanding of the intricate dynamics of energy costs and academic performance while fortifying the existing foundation laid by this study.

Additionally, while the challenges unveiled by this study are evident, they also underscore the urgency of action. The resilience and vulnerabilities of international students in the face of escalating energy costs is not just a Scottish dilemma but a global concern that demands the attention of educational institutions and policymakers alike. This research is a clarion call, not for passive reflection, but for proactive, strategic, and holistic interventions. Hence, the research outcomes have significant implications for university administrators and policymakers. Clearly, they highlight the need for tailored support mechanisms for international students, such as financial aid and university schemes specifically targeted at mitigating the impact of rising energy costs. This could involve offering flexible payment options for tuition and accommodation fees, as well as providing additional support for students who may be forced to take on part-time work to cover their living expenses, and also extending existing energy bill discounts or subsidies to include international students. Institutions could consider establishing emergency funds or hardship bursaries that students can access during times of financial difficulty. Furthermore, providing clear and accessible information on energy conservation and financial management resources could empower students to make informed decisions and reduce their energy consumption. Therefore, this is not just a revelation of challenges but the beginning of a collaborative, innovative journey towards sustainable and inclusive global education.

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