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**Analysis of Ramifications of Power Outages on
Online Teaching and Learning in South Africa**

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ABSTRACT

This qualitative paper analyses the ramifications of power outages on online teaching and Learning higher education in South Africa. Globally, online teaching and learning have been commended as the pinnacle of open distance learning. However, in South Africa, this approach has been disrupted by continuous power cuts. The analysis, in this paper, is based on the perspectives of both students and lecturers from the selected universities in South Africa. The explanatory research design is the blueprint of this study. Both students and lecturers were conveniently selected to participate in this investigation. On one hand, two focus groups consisted of students anchored in the data collection process, while on the other hand, one group focused on the lecturers. Additionally, reflexive thematic analysis was used to analyse the responses from both sets of participants. Connectivism theory anchors the golden thread in this argument. According to some of the responses from the students, power cuts cause severe disruption to their studies. The findings show that these power cuts negatively affect online teaching and learning activities as lecturers are also inconvenienced. The findings reveal that the power cuts are disrupting network connectivity. As a result, the teaching and learning process is frequently disrupted due to this problem. Thus, the study recommends that universities should invest in alternative power supply to circumvent power cut disruptions. The other recommendation exposes a need for offline teaching and learning platforms to reduce over-reliance on the national power utility also known as Eskom.

Keywords: Analysis; power outages; teaching and learning; online; universities



9th International Conference on New Findings in Humanities and Social Sciences

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1. INTRODUCTION

Online teaching and learning transformed how university education is delivered across the globe. Globally, universities offer online programmes to support the traditional way of teaching and learning. This version of teaching and learning is anchored by synchronous and asynchronous components (Anderson & Dron, 2011; Ng, 2021). In South Africa, in March 2020, all 26 universities were forced to migrate their academic activities from face-to-face to online teaching and learning model (McMurtrie, 2020; Malatji, Masuku & Baloyi, 2021; Baloyi & Malatji, 2022). As such, some of these institutions were embarking on this transition for the first time (Ng, 2021). In the process, they were also expected to prepare both lecturers and students for this new reality. The lecturers were compelled to learn the basics of teaching through online applications. The universities supported students by ensuring that all necessary tools such as laptops and tablets were accessible. Amid the online teaching and learning activities power outages disrupted the programmes. Power outages also known as load shedding in South Africa posed serious challenges to tertiary education (Lindeque, 2020; Hlatshwayo, 2022; De Ruyter, 2023). According to energy experts, the utility power Eskom's power stations are old hence the intermittent power cuts (Hofstatter, 2018; Hlatshwayo, 2022). Often, the outages allow the power utility to maintain and repair the affected power stations (Lindeque, 2020). The South African power cuts started in 2008 (Hofstatter, 2018; De Ruyter, 2023). Also, the government failed to deal with the challenge for 15 years (De Ruyter, 2023). However, this problem worsened in 2022. Notably, the power outages affect the economy, and some lost their jobs due to the same problem.

The major challenge with these power cuts is the higher stages, particularly from stage four to stage eight. It is noteworthy that these prolonged stages coincided with hybrid teaching and learning in some universities (Lindeque, 2020). As such, both students and lecturers had to grapple with the power cuts. Additionally, this problem is multipronged. First, the power cuts disrupt the live sessions, particularly online classes. In this case, the lecturers are adversely affected as they cannot carry out their tasks without electricity (Hlatshwayo, 2022). Second, students are also severely affected by power cuts. During load-shedding, they are forced to seek alternative ways of continuing with their studies. Similarly, this challenge has detrimental effects on their online assessments, specifically tests (Lindeque, 2020). Third, the disruptive aspects of power cuts are not limited to energy issues. This is because the same problem affects internet connectivity (Hofstatter, 2018). In most cases, during the higher stages of load shedding the internet connectivity is susceptible to disruptions. In this study, the focus is on the implications of power outages on online teaching and learning activities. It also expounds on the perceptions of both students and lecturers as far as this phenomenon is



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

concerned. It is imperative to study the ramifications of power outages on online teaching and learning because the models of e-learning are dominating the education sector. Thus, there is a need to interrogate issues that adversely affect e-learning to propose new models to counter existing challenges such as loadshedding and insufficient infrastructure.

2. LITERATURE REVIEW

This section focuses on the key aspects of power outages and online teaching and learning. It also encapsulates what online teaching and learning means in different contexts. In addition, the phenomenon of teaching and learning pivots the literature review in this paper. Notably, there is a paucity of literature in this field mainly because power outages are a new challenge for teaching and learning in the African context. The two merging (e-learning and power outages) aspects pose challenges for all role players in the higher education sector.

2.1 Overview of the concepts

According to Biggs (2012) and Qais (2015), teaching is a comprehensive method to enable students' lifetime learning. Furthermore, according to Qais (2015:62), "teaching also refers to the presentation of knowledge and demonstration of ability or skills." According to Dennis (2008), teaching is a process in which information is digested, stored, and created in an existing body of knowledge. Meanwhile, from a pedagogical standpoint, learning refers to the process by which pupils acquire knowledge and abilities. Learning is a metamorphosis, according to Qais (2015) and Northedge (2003), in which students engage in new learning depending on their histories and experiences. Learning is socially created to some extent. Learning should take place in a community setting (Knight, 2001). Furthermore, Qais (2015:62) states, "Learning is the acquisition of facts, skills, and methods that can be retained and used when necessary." Furthermore, Qais (2015:62) states, "Learning is the acquisition of facts, skills, and methods that can be retained and used when necessary." According to Anderson (2008:5), "Quality online learning provides many opportunities for assessment opportunities that involve the teacher, but also ones that exploit the influence and expertise of peers and external experts, others that use simple and complex machine algorithms to assess student learning, and perhaps most importantly, those that encourage learners to reflectively assess their language,"

2.2 Universal issues of online teaching and learning

According to some scholars, the online teaching and learning model is imperative to advance student access and success (Baloyi & Malatji, 2023). Globally, open distance learning is anchored by advanced technological facilities. In the United States of America where this form of teaching and learning was advocated before other parts of the world could notice its



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

effectiveness, there are many online institutions (Donitsa-Schmidt & Ramot, 2020). The purpose of this model is to ensure that learning is accessible to broader student communities. Some scholars posit that the online learning model is crucial for flexibility (Northedge, 2023; Booysen & Du Plessis, 2018). Additionally, this is needed to resolve common problems such as distance, access, and time. Previously, some students would fail to proceed with their studies due to distance. In this case, students facing this conundrum would struggle to find a university within their area of residence. With internet-based education, such students would access institutions of higher learning. As such, this demonstrates the importance of online teaching and learning model. Also, this informed some universities in the USA to focus on this form of education. According to Baloyi (2021), there is no substantial evidence that suggests that online teaching and learning erodes quality, integrity as well and academic honesty. His study exposed the multifaceted nature of virtual learning pivoted by the internet in the African context. This finding was corroborated by a study in Indonesia which underscored the value of e-learning (Bangani, 2020; Lai & Widmar, 2021; Sokhulu, 2021). In the same context, this version of teaching and learning was primarily used to ensure that civil war does not disrupt education.

Furthermore, the University of South Africa is well known for its potent academic programme. The academic activities in this African university are pivoted around online teaching and learning (Booyesen & Du Plessis, 2018; Malatji, Masuku & Baloyi, 2021). Notably, this institution offers a plethora of academic programmes through open distance learning. Accessibility to tertiary education for a myriad of African students particularly those in the rural areas fuels the purpose of Unisa. According to Baloyi and Malatji (2023), several online applications aid the management of online education. They argue that virtual learning is not delivered haphazardly. This assertion is contrary to some studies that highlighted the weakness of online teaching and learning. In the same argument, the emphasis herein is that e-learning erodes academic integrity and honesty. In other words, the major concern is the management of assessment. Some institutions investigated allegations of academic crime during online assessments. As far as examinations are concerned, the question is how we know that the right student is being assessed. In their study, Malatji, Masuku, and Baloyi (2021), exposed that some students would hire someone to write examinations on their behalf. This finding was corroborated by some universities where an invigilation application was introduced. Some scholars explicate that human interaction is the mainstay of teaching and learning, unfortunately, virtual education does not allow this (McMurtrie, 2020; Ng, 2021). The crux of the matter is that students should interact in person to stimulate peer-to-peer learning. This is aligned with student student-centred approach. The literature perused in this study also shows that artificial intelligence threatens the currency of



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

e-learning. Accordingly, this underscores that online education needs meticulous planning. This should start with how the programmes are designed. Also, the key pillars of e-learning should be infused into the teaching and learning model (Viana & Peralta, 2021). Thus, this approach should explicitly elucidate the teaching philosophy and how it affects the assessment criteria.

In South Africa, most of the universities were in a quagmire during the transition from campus-based to online teaching and learning (Malatji, Masuku & Baloyi, 2021). The challenges were multipronged. First, some universities particularly the previously black institutions were poorly prepared for the transition (Ng, 2021). The lack of infrastructure was a major challenge. Some students in these institutions did not have basic tools i.e., computers, laptops, smartphones, tablets, etc. participate in the online space. As such, these universities were compelled to support students to dwarf this challenge. Additionally, this scarcity of resources included exorbitant data bundles for internet access.

Second, the unpreparedness of the lecturers to facilitate lectures through online applications. According to Herrington and Herrington (2007:2), "Many university teachers, who are uncomfortable with their use of technology, feel somewhat threatened by these new forms of communication, knowing that in many cases, their students are more technologically competent than they are." Furthermore, while some teachers are familiar with computers, many find it difficult to adapt to mobile technologies. "The idea that there are generational differences in learning styles, for example, between Boomers, GenXers, Millennials, Neomillennials, or Net-generation, has gained traction in recent years" (Herrington & Herrington, 2007:2). Some of the lecturers lacked the basic skills to teach online classes. The facilitation of online sessions requires technical skills to use applications such as Microsoft Teams, Blackboard, Zoom, Moodle, Blueroom, Twitter Space, etc. In addition, the universities had to rapidly roll out our training programmes to close this conspicuous gap (Singh, Steele & Singh, 2021; Schaffhauser, 2022). The lecturers were trained to prepare them for online teaching and learning. In worst cases, some lecturers were primarily exposed to basic computer skills. This problem overlaps with digital illiteracy (Topal, 2016). Third, connectivity and internet issues adversely affect online education. Since this kind of education heavily depends on the Internet. It is worth noting that some students were negatively affected by this issue (Malatji, Masuku & Baloyi, 2021). In the rural areas of South Africa internet connectivity is a serious challenge with or without power outages. As such, this detrimental aspect erodes online learning. And it is against the primary objective of the online teaching and learning model. Apart from this technical issue, affordability is also a factor.



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

The cost of internet services is exorbitant in South Africa, and students are affected by this issue (Baloyi & Malatji, 2022). There are four major network entities in South Africa and two are dominating the market (Ndlovu, Ngirande, Setati & Zhuwao, 2018). As a result, the data costs are a big economic spin-off for these companies. In other words, the telecommunication market is monopolised and unfortunately affects prices and affordability of the internet rates (Ng, 2021). Some universities supply students with data bundles for internet access. Nonetheless, these data bundles are insufficient for effective use for e-learning. Fourth, the power cuts, phenomenon coincided with the instant migration from the face-to-face teaching and learning system to the virtual version (Ndlovu, et al, 2018). The e-learning movement has been riddled with power outages. Often, during blackouts the internet service is disrupted. This, therefore, means students lose both electricity and internet connectivity simultaneously. Thus, the online aspect of teaching is dismantled. Similarly, this challenge affects lecturers as they need electricity and the internet to conveniently manage online teaching. In this study, we explore the implications of power outages on online teaching and learning in South Africa. This phenomenon exists in other countries, particularly in the global South. However, in this context, the problem of this nature is new hence the need to dissect it.

3. THEORETICAL FRAMEWORK

Connectivism learning theory is a suitable lens for this study. Historically, two theorists i.e., George Siemens and Stephen Downes are recognized as the proponents of this theory (Siemens & Downes, 2006). Connectivism learning theory is a new learning theory that acknowledges the importance of technology for teaching and learning. According to Siemens (2005:2), "It also promotes group collaboration and discussion, allowing for different viewpoints and perspectives when it comes to decision-making, problem-solving, and making sense of information". The key canon of this theory posits that technology should be at the forefront of teaching and learning in the digital age. Accordingly, the digital age challenges both teachers and learners to rethink the role of technology in knowledge development. This theory suggests that new technology such as social media, online networks, blogs, or information databases can support new-age learning (Donitsa-Schmidt & Ramot, 2020). Thus, in this paper, we use connectivism principles to anchor our argument regarding the ramifications of power outages on online teaching and learning. Teaching and learning through online networks is a far-fetched reality in an environment where the power supply is constantly unreliable. Learning in the digital age needs a stable grid to power the new technologies. Undoubtedly, technological innovations need electricity to perform optimally. Both students and lecturers are affected by the intermittent power cuts. As such, online



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

networks are often disrupted by load-shedding which erodes the principles of connectivism learning theory.

4. METHODOLOGY

This section focuses on the apt approach, research design, sampling, data collection as well and data analysis method.

Explanatory research design is the blueprint for this investigation. This design underscores that a study should expound on the triggers and effects of a phenomenon (Wimmer & Dominick, 2014). Additionally, it explicates those studies investigating how aspects converge and interact. Explanatory research seldom ends because new ideas, tools, information, and techniques are increasing. Researchers, therefore, elucidate the critical components of this phenomenon in the South African context. This paper is centred around a qualitative research approach to analyse the ramifications of load-shedding on online education in South African universities. This approach is apt in this case as it enables researchers to gather data from relevant role players i.e., students as well as lecturers (Taherdoost, 2016). This method requires meticulous techniques to facilitate human interaction during the interviews (Creswell, 2014). Researchers employed a convenience sampling technique within the non-probability sampling method. This technique was used to select the participants for the focus group interviews. According to Berger (2016), the convenience sampling technique suggests that participants are conveniently drawn from the population of the study. This procedure is informed by the availability of the participants (Creswell, 2014). This sampling technique was used to select both lecturers and students. This was convenient as the students were easily from our class. Similarly, the lecturers were recruited from our colleagues in the School of Languages and Communication Studies at the University of Limpopo. Notably, the interview guide was used to manage the focus group sessions. Three groups were assembled to collect data. Two groups comprised students from the same university in Limpopo province, South Africa. Ten students were part of these focus groups with five members per group. Data saturation was considered during the process of gathering the data. Thus, the number of participants interviewed in the study was informed by data saturation. After moderating the first group, the data yielded from the other groups were redundant. The other group entertained the lecturers. In this case, three lecturers were interviewed. These sessions were held online via Google Meet. Reflexive thematic analysis from the body of thematic analysis has been employed to analyse data for this study. This procedure was anchored by the steps of thematic analysis which is apt for the analysis of perceptions and other relevant data. The researchers evaluated the transcripts adopted from the audio-visual recordings to assess, generate, identify, and code the relevant themes. Thus, the five themes emerged from



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

the focus group discussions informed by the key questions of the study. Also, these themes were cultivated from the responses based on the perceptions of both students and lecturers (participants of the study) concerning the ramifications of power outages on online teaching and learning. The same themes are encapsulated in the data analysis section. It is worth noting that the main themes emerged from the data. The detrimental aspects of power outages dominated the focus group discussions.

5. DATA ANALYSIS

The following data analysis and the developed themes emanate from the data that has been collected from both students and academics.

5.1 Theme 1: University students' personal experiences with power outages

Students strongly concede that power outages have a detrimental effect in their lives. Students rely on electricity for most of their activities including cooking, ironing clothes, and business activities among others. Without electricity, all these activities have to stop and it ultimately affects their being. Some of the respondents share their views in this way:

"...My personal experience with load shedding is very bad, I also own a small business selling fast food, such as bunny chow and chips, and when load shedding strikes, I have to use a gas stove, which I'm not familiar with ..." (Respondent B3)

"...I'm a fashion designer, and I use electricity to sew..." (Respondent A3)

"...I'm a news anchor and a student, and I'm expected to send the news to the station, but due to load shedding I honestly find it difficult sometimes..." (Respondent B2)

Students also postulate that power outage also affects their social lives. The absence of electricity affect internet connections which makes it difficult to communicate with family and friends.

"...Firstly, load shedding affects communication between loved ones..." Respondent B5)

Students also concede that power outage also affects social lives as far as entertainment is concerned. They highlight that it is impossible to have access to television, radio, and all social media platforms.



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

5.2 Theme 2: The impact of power outages on students' online learning

Students express that electricity is of significance since the university has adopted multimodal learning following the Coronavirus (COVID-19) pandemic. However, the recurring power outages prove to be a harmful factor for online learning. Students postulate that due to load shedding which also affects internet connections, they are unable to attend their online classes. Some of them expressed themselves in this manner:

"...When I log in to Blackboard, the system will kick me out due to poor internet coverage..."
(Respondent A2)

"...Sometimes, the system will allow me to log in, but the account won't be active, meaning, I won't hear anything, or it won't allow me to speak due to poor internet connections..."
(Respondent B5)

It is worth noting that as much as lecturers would record and upload sessions through the Learning Management System (LMS), students are not fond of listening to recordings. They indicate that recordings take away the engagements and discussions that they would normally enjoy in a venue-based setting. This is how they expressed their views:

"...Well, the issue of recording on its own is a problem since we can't ask questions or have an engagement with the lecturer..." (Respondent A4)

"...I'm a person who loves and enjoys engaging with my lecturers and fellow students, hence I don't enjoy listening to recordings..." (Respondent B3)

"...Again, load shedding also affects how we manage our academic lives, in most cases we are caught in between listening to lecture recordings, writing assignments, and submitting before set deadlines..." (Respondent A2)

5.3 Theme 3: Power outages and students' academic performance

Students have mixed opinions on whether power outages might hurt their academic performance. Some concede that load shedding affects their academic performance since it affects their preparations for assessments. This is how some of them shared their experiences:

"...Yes, it does affect my performance. We end up relying on recordings which affect how we prepare for our exams..." (Respondent A1)



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

“... I use my laptop and my phone but then my laptop since it only works while plucked into power, during load shedding, it doesn't work...” (Responded B1)

“...It is quite difficult to listen to a lecture recording and make time to study...” (Responded B5)

However, there are those students who feel that power outages do not affect their academic performance:

“...No, it does not affect my academic performance. I excel with or without load shedding...” (Respondent A1)

“...No, it doesn't necessarily affect my academic performance, I still excel...” (Respondent A2)

5.4 Theme 4: Strategies to mitigate the impact of power outages on education

As much as students acknowledge the detrimental effects of power outages on education, they seem not to have resolutions to address it. Students indicate that they find it difficult to navigate their academic activities amid load shedding. Some of them highlight that in most cases they are forced to sleep and wait for the power to be restored to continue with their studies. Some of the students had to buy rechargeable lamps to have light during load shedding. Some of those who stay off campus indicate that they mostly travel to the campus library to hotspot their gadgets for online class attendance, download study materials, and other academic-related activities. Some of them shared their views in this way:

“...To be honest, I don't have any strategies because when there's load shedding there's no network, and there's nothing that I can do. I just relax and wait for electricity to come back...” (Respondent A4)

“...Load shedding is so stressful because I can't compile my notes down. So in a nutshell, I make sure that I download all study materials, save them, and charge all my gadgets...” (Respondent B5)

5.5 Theme 5: Academics' experiences of power outages on online teaching and learning

As much as they embrace the adoption of multimodal teaching and learning in universities, academics concede that power outages have a negative impact on their teaching activities. Academics indicate that load shedding affects how they prepare lessons for their students.



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

They are unable to look for new literature and current information through online resources due to power outages. This academic expressed his view in this manner:

“...It had a major impact on how we teach and also how the students learn and also searching for information for postgraduate students...” (Respondent C1)

Furthermore, academics postulate that load shedding also affects their online sessions since they struggle to log into the Learning Management System as a result of poor internet connections. Load shedding which sometimes goes for more than six hours a day, also affects how academics assess their students. Academics always receive complains from students who could not complete their assessments due to power outages and poor internet connections.

“... We mostly receive texts and emails from students saying that they couldn't complete their assessments, it could be a test or exam...” (Responded C2)

To mitigate these challenges, academics have adopted an open policy where they assist students with any queries even outside the set consultation times. Academics have created WhatsApp groups with students for different modules, where they can be easily accessible at any given time. Academics also propose that institutions of higher learning should improve their Information and Communication Technologies (ICTs) infrastructure by acquiring advanced laptops, inventors and power banks to mitigate the effects of load shedding. Universities should also enhance their adoption of solar energy to complement the existing energy.

6. DISCUSSION OF FINDINGS

The study has established that the recurring power outages have a detrimental effect on online higher education's online teaching and learning. Load shedding has created an unconducive environment for academics and students alike. Both parties are struggling to circumvent the negative effects of power outages on online teaching and learning. Students are struggling to participate in the most important components of higher education including attending classes, studying, and writing assessments. The regular load shedding which can be experienced for more than six hours a day also destabilises the internet connection which is the most significant component of online teaching and learning. The study has also established that students are mostly left on their own without receiving the necessary support to mitigate the effects of load shedding on online teaching and learning. Students are expected to come up with solutions for how they attend online classes and writing of assessments. Furthermore, academics are also finding it difficult to prepare their lessons



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

under the circumstances of power outages. The study has established that lecturers are not provided with supporting resources such as power banks and enough internet data to facilitate online teaching and learning. This comprises the quality of education received by students under the conditions of load shedding.

7. CONCLUSION AND RECOMMENDATIONS

It is proven that power outages have a negative impact not only on online teaching and learning but also affects the economy and the socio-economic aspects of the society. Both students and academics need necessary support from institutions of higher learning to properly facilitate quality teaching and learning. Power outages have been existing since the year 2008 in South Africa, and the government has not provided a concrete solution to this challenge. After the advent of the Coronavirus (Covid-19) in 2019, institutions of higher learning adopted multimodal learning where the majority have been advised to adopt online teaching and learning mostly for studies which does not need a practicum component. This was adopted following the advice from health experts to mitigate the spread of the virus. However, power outages have made it difficult for such to operate without challenges. Universities with poor infrastructure are struggling to facilitate quality online teaching and learning due to load shedding. Universities should look for an alternative source of power including solar and green energy. However, it should be noted that the issue of power outages in South Africa is a complex situation that is solely in the hands of the government. Thus, the government should enhance its adoption of green and renewable energy to supplement the existing coal energy to quickly end power outages, while also exploring what to do with the existing coal in the country.



9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

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9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

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9th International Conference on New Findings in Humanities and Social Sciences

28-30 July 2023

Dublin, Republic of Ireland

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