

ISSN 2410-4981. E-ISSN 2508-1055

2023. 10(2). Issued 3 times a year
Has been issued since 2014.

EDITORIAL STAFF

Jacob Owusu Sarfo – University of Cape Coast (Ghana) & Centre for Behaviour and Wellness Advocacy [CBWA] (Ghana), Ghana (Editor in Chief)
Josephine Cudjoe – University of South Africa (South Africa) & CBWA, Ghana (Member)
Michael Asiedu – Ashesi University (Ghana) & CBWA, Ghana (Member)
Dean Attigah – University of Ghana (Ghana) (Member) & CBWA, Ghana (Member)
Newton Isaac Gbordzoe – University of Ghana (Ghana) (Member) & CBWA, Ghana (Member)

EDITORIAL BOARD

Arturo García-Santillán – Cristóbal Colón University, Mexico
Priscilla Yeye Adumoah Attafua – Maastricht University, Netherlands
Marina Drushlyak – Makarenko Sumy State Pedagogical University, Ukraine
Luan Nguyen Thanh – Thuyloi University, Vietnam
Mustapha Amoadu – University of Cape Coast, Ghana
Olena Semenikhina – Makarenko Sumy State Pedagogical University, Ukraine
Uzma Azam – Aligarh Muslim University, India
Alexander Fedorov – Rostov State University of Economics, Russian Federation
Jade Kouletakis – Abertay University, United Kingdom
Azaz Bin Sharif – North South University, Bangladesh

Journal is indexed by: **DOAJ** (Sweden), **EBSCOhost Electronic Journals Service (EJS)** (USA), **Open Academic Journals Index** (USA), **Sherpa Romeo** (Spain), **Crossref** (USA), **ROAD**, the Directory of Open Access scholarly Resources.

Disclaimer: All manuscripts are peer-reviewed by experts in their respective fields. Authors of the manuscripts bear responsibility for their content, credibility, and reliability.

The Editorial Board doesn't expect the manuscripts' authors to always agree with its opinion.

Postal Address: P. O. Box FW 22, Effiduase-Koforidua, Eastern Region, Ghana

Release date 23.08.23
Format 21 × 29,7/4.

Website: <http://kadint.net/our-journal.html>
E-mail: jacob.sarfo@cherkasgu.press

Headset Georgia.

Founder and Editor: Centre for Behaviour and Wellness Advocacy, Ghana
Co-publisher: Cherkas Global University, USA

Order № 27.

CONTENTS

Editorial

Artificial Intelligence Chatbot – ChatGPT and High-Tech Plagiarism Concerns in a Digital Age: Is Detection Possible? J. Owusu Sarfo	55
---	----

Articles

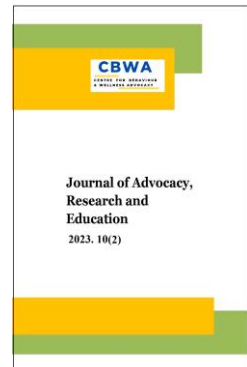
Visual Impairment among Public School Children in the Biadan and Kato Circuits in the Berekum Municipality, Bono Region, Ghana E. Mana Akpakli, A. Jeffrey Munsamy	59
Instructional Design to Cultivate Expert Learners Using Universal Design for Learning: An Overview Yaqin Fan	68
Spirit World and Wealth Creation: Theological Reflections on Pastoral Care for Sakawa Victims at the Patmos Prayer and Retreat Center, Ghana E. Kwame Tham-Agyekum, M. Obeng, I. Boamah	80
Secondary School Learners' Online Learning Experiences During COVID-19 Lockdown M. Chirove, I.C. Ogbonnaya	93



Publisher: Centre for Behaviour and Wellness
Advocacy, Ghana
Co-publisher: Cherkas Global University, USA
Has been issued since 2014
ISSN 2410-4981. E-ISSN 2508-1055
2023. 10(2): 55-58

DOI: 10.13187/jare.2023.2.55

Journal homepage:
<http://kadint.net/our-journal.html>



Editorial

Artificial Intelligence Chatbot – ChatGPT and High-Tech Plagiarism Concerns in a Digital Age: Is Detection Possible?

Jacob Owusu Sarfo  a, b, c, d, *

^a University of Cape Coast, Cape Coast, Ghana

^b Centre for Behaviour and Wellness Advocacy, Koforidua, Ghana

^c Cherkas Global University, Washington, USA

^d Volgograd State University, Volgograd, Russian Federation

Abstract

The digital age of the 21st century has brought an ascent of artificial intelligence technology used in various sectors. The growth and influence of artificial intelligence technology and tools on education and academic publishing have become an important topic recently. With the latest developments in artificial intelligence chatbots, detecting high-tech plagiarism and ensuring academic integrity in scholarly writing has become a worry with the educational and scientific publishing community. In this editorial, I briefly engaged one of the most popular artificial intelligence chatbots, ChatGPT, to write a paragraph with the prompt – “Write an original paragraph introducing High-Tech Plagiarism and add in-text citations and a main reference list in APA.” To this end, it generated a text with 235 words and 1,565 characters. Subsequently, I submitted the text to Turnitin and obtained a Similarity Index of 0 % and an artificial intelligence percentage of --%. Additionally, I solicited ChatGPT to authenticate if the paragraph was produced by itself. It confirmed with the feedback, “Yes, the paragraph introducing “High-Tech Plagiarism” and the associated in-text citations and references were generated by ChatGPT.” This conversation and further checks affirm the findings of previous studies that ChatGPT can produce sophisticated textual outputs that can slip undetected by plagiarism detection tools like Turnitin. Implications are discussed in the paper.

Keywords: Artificial Intelligence Chatbot, ChatGPT, High-Tech Plagiarism, Digital Age, Turnitin, Originality.

1. Artificial Intelligence Chatbot - ChatGPT and High-Tech Plagiarism

Artificial Intelligence (AI) chatbots are gradually becoming prominent in several sectors, including education and scientific publishing (King, ChatGPT, 2023; Kuhail et al., 2023; Sarfo, 2023). As effective conversational technology, AI chatbots exhibit unique intelligence and facilitate writing productivity in an academic environment (King, ChatGPT, 2023). One of the popular AI chatbots in education and scientific publishing is ChatGPT (Lo, 2023; Sarfo, 2023). The development of ChatGPT was founded on large language models since its launch on

*Corresponding author

E-mail address: jacob.sarfo@ucc.edu.gh (J.O. Sarfo)

November 30, 2022, by OpenAI. After its inception, ChatGPT continues to improve its features to provide sophisticated textual outputs that have attracted global user attention (Marr, 2023). According to an editorial on Forbes, “...the chatbot quickly went viral on social media as users shared examples of what it could do. Stories and samples included everything from travel planning to writing fables to code computer programs. Within five days, the chatbot had attracted over one million users” (Marr, 2023).

Marr (2023) further argued that ChatGPT has challenged the global definition of AI and its capacities. Specifically, Marr noted that “this chatbot has redefined the standards of artificial intelligence, proving that machines can indeed “learn” the complexities of human language and interaction.” Although the impact of ChatGPT on several industries and applications cannot be underestimated, dealing with high-tech plagiarism is a real challenge to education and scientific publishing circles (Kuhail et al., 2023; Sarfo, 2023). A common example is a recent finding by Khalil and Er (2023), which observed that 50 essays generated by ChatGPT were seen as original texts by popular plagiarism detectors like Turnitin® and iThenticate®. Both anti-plagiarism tools were developed by “iParadigms LLC” and are well known for detecting plagiarized texts since 1997. Moreover, the authors confirmed that ChatGPT could better demonstrate the authorship of these essays as self-generated, outperforming the well-known conventional plagiarism detection tools like Turnitin® and iThenticate®.

Evidence from Khalil and Er (2023) supports the recent worries surrounding some students and authors depending solely on chatbots such as ChatGPT to quickly and effortlessly produce sophisticated outputs without being detected. Although the use of ChatGPT is not entirely wrong, detecting high-tech plagiarism remains a major concern, as exhibited in my conversation with ChatGPT and subsequent assessment with plagiarism detection tools.

2. Conversation on ChatGPT

The author (JOS) conversed with ChatGPT in this section and directly posted their output without edits.

[JOS: Write an original paragraph introducing High-Tech Plagiarism and add in-text citations and a main reference list in APA.]

ChatGPT: High-Tech Plagiarism, a burgeoning concern in contemporary academia, is marked by the unethical use of technology to copy, replicate, or manipulate digital content without proper attribution or authorization (Smith, 2019). This phenomenon has gained prominence with the proliferation of digital tools and online resources, enabling students, researchers, and content creators to engage in deceptive practices that challenge the principles of academic integrity (Johnson, Brown, 2020). High-Tech plagiarism encompasses various tactics, such as the surreptitious deployment of AI-generated essays, automated paraphrasing software, or the purchase of pre-written papers from online sources (Brown, Jones, 2021). These practices not only undermine the authenticity and originality of academic work but also pose significant challenges for educational institutions seeking to uphold ethical scholarship (Garcia et al., 2018). To address this evolving issue effectively, academic institutions must implement robust policies and educational initiatives aimed at combating high-tech plagiarism while promoting ethical conduct (Roberts, 2022).

References (Note: These references do not exist):

Brown, A., & Jones, C. (2021). Plagiarism in the digital age: A comprehensive analysis of modern unethical practices. *Journal of Academic Ethics*, 15(3), 189-205.

Garcia, M., Smith, P., & Johnson, R. (2018). High-Tech Plagiarism: A new challenge for educators. *Journal of Educational Technology*, 42(2), 214-230.

Johnson, L., & Brown, K. (2020). Digital ethics: Understanding technological plagiarism in the 21st Century. *International Journal of Ethics in Education*, 7(1), 45-60.

Roberts, S. (2022). Countering high-tech plagiarism: Strategies for educational institutions. *Academic Integrity Journal*, 9(4), 325-341.

Smith, J. (2019). The digital dilemma: High-Tech Plagiarism in contemporary academia. *Ethics in Education Quarterly*, 35(2), 123-139.

4. High-Tech Plagiarism Evaluation and Concerns

Following our conversation, I submitted the generated text from ChatGPT to Turnitin and obtained a Similarity Index of 0%, as shown in Figure 1. A further check on the AI percentage showed --%, meaning “AI writing detection unavailable”. To confirm Khalil and Er’s (2023) assumption that ChatGPT can detect texts detected by self was also tested by entering the same text back to authenticate if the paragraph was produced by itself. It confirmed with the feedback, “Yes, the paragraph introducing “High-Tech Plagiarism” and the associated in-text citations and references were generated by ChatGPT.”

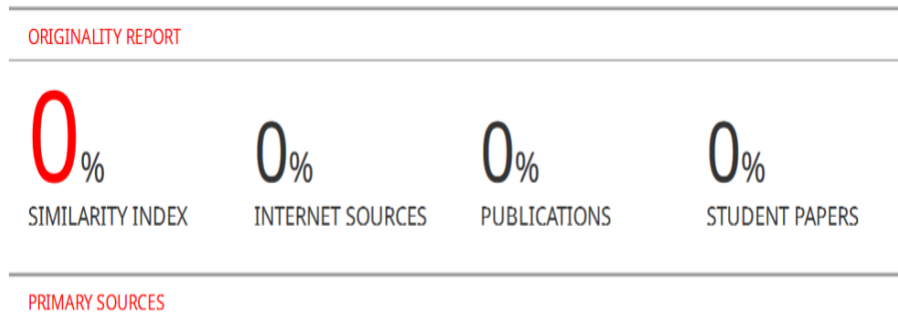


Fig. 1. Turnitin® Originality Report to ChatGPT’s Output

4. Limitations and Implications

This paper is not intended to draw any generalisations as it used a single AI chatbot, ChatGPT, one detection tool (Turnitin®), and a single output. Similar to other previous studies by Khalil and Er (2023), this paper only demonstrated the challenges faced by the world’s educational and scientific publishing as AI becomes the “new normal.” Regarding the implications of this study, there is a need for institutions and educators to transform their teaching and assessment approaches to incorporate creativity and critical thinking rather than replicable tasks that learners can easily outsource to AI tools. Similarly, this paper underlines the need to promote further discussions of AI’s ethical and responsible use in education. Notwithstanding the limitations of this paper, the evidence calls for continuous advancements of AI-powered plagiarism detection systems that can keep pace with evolving trends of high-tech plagiarism. This paper further points to a complex debate where technological advances in AI come with immense opportunities and challenges for educational and scientific publishing settings.

4. Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

Conflict of interest statement

The author reports no conflicts of interest.


Funding

Not applicable.

Acknowledgements

I thank the Centre for Behaviour and Wellness Advocacy, Ghana, for their editing support.

Authors’ ORCID

Jacob Owusu Sarfo  <https://orcid.org/0000-0003-2859-7278>

References

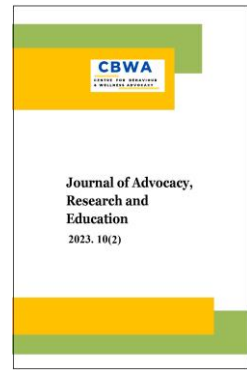
- King, ChatGPT, 2023 – King, M.R., *ChatGPT*. (2023). A conversation on artificial intelligence, chatbots, and plagiarism in higher education. *Cellular and Molecular Bioengineering*. 16(1): 1-2.
- Kuhail et al., 2023 – Kuhail, M.A., Alturki, N., Alramlawi, S., Alhejori, K. (2023). Interacting with educational chatbots: A systematic review. *Education and Information Technologies*. 28(1): 973-1018.
- Kuhail, Er, 2023 – Khalil, M., Er, E. (2023). Will ChatGPT get you caught? Rethinking of plagiarism detection. *arXiv preprint arXiv:2302.04335*.
- Lo, 2023 – Lo, C.K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences*. 13(4): e410.
- Marr, 2023 – Marr, B. (2023, May). A short history of ChatGPT: How we got to where we are today. [Electronic resource]. URL: <https://www.forbes.com/sites/bernardmarr/2023/05/19/a-short-history-of-chatgpt-how-we-got-to-where-we-are-today/?sh=63a2a163674f>
- Sarfo, 2023 – Sarfo, J.O. (2023). Artificial intelligence chatbots, high-tech plagiarism, and academic publishing integrity conundrum: Are local journals in Africa ready? *Journal of Advocacy, Research and Education*. 10(1): 3-5.



Publisher: Centre for Behaviour and Wellness
Advocacy, Ghana
Co-publisher: Cherkas Global University, USA
Has been issued since 2014
ISSN 2410-4981. E-ISSN 2508-1055
2023. 10(2): 59-67



DOI: 10.13187/jare.2023.2.59

Journal homepage:
<http://kadint.net/our-journal.html>



Articles

Visual Impairment among Public School Children in the Biadan and Kato Circuits in the Berekum Municipality, Bono Region, Ghana

Elizabeth Mana Akpakli ^{a,*}, Alvin Jeffrey Munsamy ^a

^aUniversity of KwaZulu-Natal, Durban, South Africa

Abstract

The aim of the study was to determine the prevalence and causes of visual impairment (VI) among primary school children in the Biadan and Kato circuits in the Berekum Municipality, Bono Region, Ghana. A cross-sectional and a two-stage random sampling technique was employed to recruit 299 study participants. Visual acuity, retinoscopy, examination of the anterior segment, media and fundus were conducted on each participant. A modified refractive error survey in children (RESC) protocol was used in collecting data. A presenting visual acuity of $\leq 6/12$ in the better eye was diagnosed as having VI with a cause. Prevalence was estimated, and binary logistic regression was used to determine the strength of the association between visual impairment and independent variables at a 95 % confidence interval. Two hundred and ninety-five (295) children with a mean age of 10.08 ± 2.18 years were able to go through all examinations. The prevalence of VI was 8.14 %. Twenty-four children were visually impaired, of whom 17 (70.83 %) were females and 7 (29.17 %) were males. Refractive error was the cause in 67 % of visually impaired children, cataracts in 8 %, and amblyopia in 4 %. Age was found to be associated with VI (OR=0.77; 95 % CI:0.63-0.95), while gender showed no association. Uncorrected refractive error is a common cause of VI among school children in the Biadan and Kato circuits. Age was negatively associated with visual impairment, suggesting the vulnerability of younger school children. Early detection and provision of affordable eye health services may help curb preventable VI.

Keywords: causes, Ghana, prevalence, public school, school children, visual impairment.

1. Introduction

Visual impairment (VI) remains a public health concern amongst different population groups. In school children, it considerably impacts learning and academic achievement, especially in under-served and under-resourced communities (Ovenseri-Ogbomo, Omuemu, 2010). Global estimates indicate that there are approximately 19 million visually impaired children worldwide, with many of them living in Africa (Alrasheed et al., 2016). Of these, 1.4 million are blind, and 17.5 million have low vision. According to the World Health Organization (WHO, 2013), visual impairment in children is defined as visual acuity (VA) of less than, or equal to, 6/12 (0.3LogMAR) in the better eye.

*Corresponding author
E-mail address: bethmanasco@yahoo.com (E.M. Akpakli)

The prevalence of childhood visual impairment varies between countries and over time. Surveys have found the prevalence of visual impairment amongst primary school children to be 19.9 % in Nigeria (Bezabih et al., 2017), 7.24 % in Ethiopia (Ayanniyi et al., 2010), and 3.5 % in a sample of private school children in the Ashanti Region of Ghana (Kumah et al., 2013). According to Bezabih et al. (2017), the prevalence in these populations is due to the low level of prevention techniques, such as low level of awareness about the early detection of, and intervention in, visual impairment and the non-availability of advanced health services.

The major cause of blindness in children varies widely from region to region, largely determined by socioeconomic development and the availability of primary health and eye care services. In sub-Saharan Africa, refractive errors (REs), trachoma and vitamin A deficiency are the commonest causes of VI among school children. In other low- and middle-income countries (LMICs), such as Brazil, Ethiopia and India, studies have shown a significantly higher prevalence of VI due to RE, ranging from 65.9 % to 92.5 % (Mehari, 2013). These suggest that RE is one of the leading causes of VI in school children in LMICs, and this is concerning, as it is correctable. There is a continuing need for population-based studies to provide an up-to-date characterisation of the magnitude and nature of visual impairment problems in order to develop local programmes and supra-national, continental and global prevention strategies. However, there is no known documented data on the prevalence of visual impairment amongst public school children in the Berekum Municipality in Ghana.

Therefore, this study aimed to provide baseline data on the prevalence and causes of visual impairment amongst public school children in Berekum, specifically in the Biadan and Kato circuits. The results of this study may aid in informing the planning and monitoring of sustainable eye health programmes. They may also help the government to implement preventive measures for visual impairment in school-going children.

2. Method

Design

A cross-sectional study design was adopted to determine the prevalence and causes of visual impairment among school children.

Population

Our study targeted in-school children in the Kato and Biadan circuits in the Berekum Municipality, Bono Region, Ghana. According to the Ghana Statistical Service Report (2014), the number of basic schools in the Berekum Municipality in 2016 was 121. The number of primary school children attending both public and private schools in the municipality in 2016 was 47,777, of which 23,885 were males and 23,892 were females; thus, 36.7 % of the population were school children. The Berekum education directorate is divided into eight circuits; two circuits (Biadan and Kato) were selected for the study. The Biadan circuit has seven (7) schools, and the Kato circuit has ten (10) schools. The total number of school children in both circuits in 2016 was 3,658. The municipality was also served by various health facilities which provide different services, including eye care services.

Sampling and sample size

Multi-stage random sampling was used in selecting participants. Four (4) schools from the Biadan circuit and five (5) schools from the Kato circuit were randomly selected, summing up to nine (9) schools from both circuits. Simple random sampling was then employed to select the children from those schools.

A sample size of 360 was calculated using Slovin's formula, in consultation with a statistician, where $n = N / (1 + Ne^2)$, N = population and e = error of tolerance. In this case, $N = 3,658$, $e = 0.05$, and a confidence level of 95 % was used. However, only 299 children participated in this study after sampling. All male and female Primary One to Six school-going children present during data collection were included in the study. All children without signed, written informed consent from parents or guardians were excluded from the study. Also, primary school children younger than six years were excluded from the study.

Data collection

Primary One to Six children were enumerated by name, age and gender. Detailed information regarding clinical examinations was included. All examinations and procedures were done according to the refractive error study in children (RESC) protocol (WHO, 2007), with specific

modifications to serve the purpose of this study and to accommodate the availability and affordability of instruments. Three local optometrists and one nurse conducted the eye examinations.

Monocular visual acuity testing was performed using an ETDRS LogMAR chart at 4 metres from the participant, with natural daylight room illumination. The right eye was tested first, followed by the left eye. The eye not being tested was occluded with the participant's palm while ensuring that the participant was not pressing on their eye. This procedure was carried out by researcher ID#4.

The eyelids, conjunctiva, cornea, iris, and pupils were examined with a magnifying loupe and torch light by researcher ID#3. In addition, the lens, vitreous humour and retina of children presenting with visual acuity of 0.3LogMar (20/40), or worse, in either eye, were examined for abnormalities using an ophthalmoscope in a darkened room. All abnormalities seen in the structures of the eye were noted and recorded.

The cover test was conducted by researcher ID#2 at both 0.5 m and 4 m. All ocular alignment assessments were performed without spectacles, as their use may affect the magnitude of the deviations present. Initially, ocular alignment was determined using Hirschberg corneal reflections, followed by a cover/uncover test using an occluder and performed at 0.5m and 4 m. All heterotropias identified were classified as esotropia, exotropia or vertical tropia.

In all participants presenting with visual acuity of 0.3 LogMAR (6/12), or worse, a principal cause was assigned by researcher ID#1. According to the protocol used, refractive error was assigned as the cause if acuity improved to 0.2LogMar (20/32) or better with subjective refraction. Hyperopia was defined as a spherical power of $\geq + 0.75$ D in both eyes or in one eye if the other eye was emmetropic. Myopia was assigned as a spherical power of $\geq - 0.50$ D in both eyes or one eye if the other eye was emmetropic. A cylindrical power of $\geq - 0.50$ D in both eyes or one eye, if the other eye was emmetropic, was also considered astigmatism. Amblyopia was also classified as a subnormal visual acuity, with or without improvement with a pinhole, where no ocular pathology was found. In the absence of refractive errors, opacities in the lens found in participants presenting with visual acuity of 0.3 LogMAR or worse were noted and classified as cataracts. Participants who were found to have minor eye problems, such as allergic conjunctivitis, were treated accordingly, whilst those who needed further management were referred to the nearest eye care facility.

Ethical considerations

Approval for the study was obtained from the Biomedical Research Ethics Committee (BREC) (with ID number BE401/14) of the University of Kwazulu-Natal and the Ghana Health Service Ethics Committee (protocol ID GHS-ERC 10/10/14). Permission was also sought from the municipal education directorate and selected school heads. Informed consent was obtained from parents or legal guardians before data collection.

Data Analysis

Data analysis, with the assistance of a biostatistician, was conducted using STATA 11. All data gathered were analysed using descriptive statistic tools such as means, standard deviations, frequencies and percentages, where appropriate. The Pearson chi-square test and the independent sample t-test were also used to test for the statistical significance of differences in observations. A p-value of less than, or equal to, 0.05 was considered statistically significant. A binary logistic regression statistical model was fitted between demographic characteristics (age and gender) and visual impairment.

3. Results

Demographic characteristics of the study sample

As shown in [Table 1](#), of the 360 school children randomly selected from nine schools in Biadan and Kato circuits, 299 (83.1 %) participated in the study. However, there were complete datasets for only 295 (81.9 %) children which were analysed. The 295 children were aged between 6 and 16 years, with a mean age of 10.08 ± 2.18 years. The participants were divided into four groups: group 1 (6-8 years) with a mean age of 5.5 years; group 2 (9-11 years) with a mean age of 9.0 years; group 3 (12-14 years) with a mean age of 12.0 years; and group 4 (15-16 years) with a mean age of 15.0 years. There were 135 (45.76 %) males and 160 (54.24 %) females. The males had a mean age of 10.28 ± 2.20 years (range: 6-16 years), while the females had a mean age of 9.91 ± 2.16 years

(range: 5-15 years). Of the children, 110 (37.3 %) were from the Biadan circuit, and 185 (62.7 %) were from the Kato circuit. All participants were from primary schools in the public domain.

Table 1. Demographic characteristics of the study sample, n = 295

Characteristics	Frequency	Percentage (%)
Sex		
Female	160	54.2
Male	135	45.8
Age (years)		
Group 1 (6-8)	37	12.5
Group 2 (9-11)	127	43.0
Group 3 (12-14)	119	40.3
Group 4 (15-16)	12	4.1
Circuits		
Biadan	110	37.3
Kato	185	62.7
Type of School		
Public	295	100
Private	0	0

Prevalence of Visual Impairment

The prevalence of VI was 8.14 % of the overall sample. Of those with visual impairment, 54.17 % had bilateral visual impairment, 25 % had impairment in the left eye, and 20.83 % had impairment in the right eye. Bilateral visual impairment was more prevalent than unilateral visual impairment. See [Table 2](#) for details.

Table 2. Distribution of Visual Impairment among school

Visual Impairment	Frequency	Percentage (%)
Both Eyes	13	54.2
Right Eye only	5	20.8
Left Eye only	6	25.0
Total	24	100

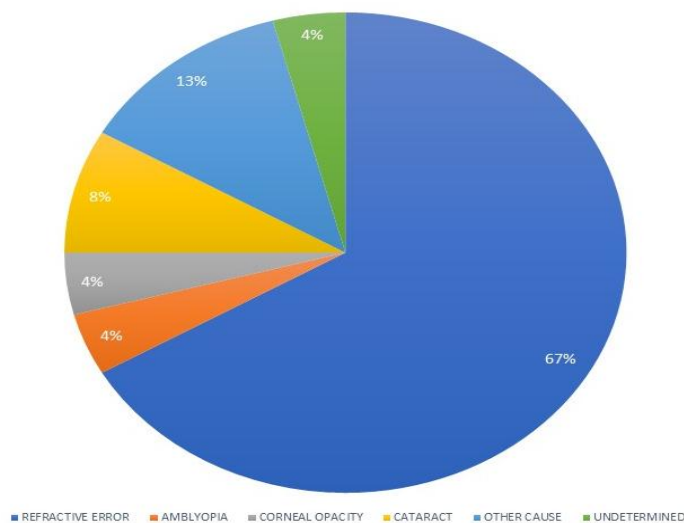


Fig. 1. Causes of visual impairment in children attending public (primary) schools (n= 295)

Causes of Visual Impairment

Figure 1 shows that out of the 24 school children with visual impairment, 16 (67 %) of the children had uncorrected refractive error, followed by cataracts in 2 (8 %) of the children. One child each had visual impairment as a result of amblyopia and corneal opacity. The amblyopia was due to an uncorrected refractive error without any pathology. Hence, the prevalence of refractive error for the entire study population was 5.4 %, followed by cataract, 0.7 % and then amblyopia, 0.3 %.

Pattern of Refractive Error

Table 3 shows that of the children with uncorrected refractive error (16), 9 (56.3%) had myopia, with astigmatism in 25% and hyperopia in 18.75%. Thus, the prevalence of myopia, astigmatism and hyperopia for the study sample was 3.1%, 1.4%, and 1.0%, respectively.

Table 3. Pattern of Refractive Error, n = 295

Type of Refractive Error	Frequency	Percentage (%)
Myopia	9	3.1%
Astigmatism	4	1.0%
Hyperopia	3	1.4%

Factors Affecting Visual Impairment

Direct logistic regression was performed to assess the impact of two factors on the likelihood that participants would be visually impaired. The model contained two independent variables (age and gender). Age was found to be associated with visual impairment, while gender was not, as shown in Table 4. The odds ratio of 0.77 for age suggests if the age of the school children increased by one year, the odds of visual impairment decreased by 23%.

Table 4. Factors Associated with Visual Impairment among Primary School Children

Variables	OR	95% CI	P-value
Age	0.77	0.63 – 0.95	0.014
Gender	0.50	0.20 – 1.25	0.136

4. Discussion

At the end of the study, an overall prevalence of visual impairment observed among children in primary schools in the Biadan and Kato circuits in the Bono Region was 8.14 %. This prevalence was almost three times more than in a study on private school children in the Ashanti Region of Ghana conducted by Kumah et al. (2013), which found a prevalence of 3.66 %. The difference in the results may lie in the geographical location and the characteristics of the population. The Ashanti Region is more developed, with numerous health facilities; its inhabitants, especially those who attend private schools, can afford eye care services more than those in the Biadan and Kato circuits in the Bono Region (formerly Brong Ahafo). The prevalence found in the current study is similar to that (8.0 %) found in a study conducted by Zelalem et al. (2019) amongst school children in three primary schools in Sekela Woreda, north-west Ethiopia. This similarity could be attributed to the same definition of visual impairment in both studies: visual acuity of 6/12, or worse, in either eye or both eyes. Also, the researchers indicated that the study area in the Ethiopian study was rural and remote, with no adequate health care or primary eye care services, which is similar to the situation in the Biadan and Kato circuits. The prevalence in the present study is, however, lower than that (19.9 %) found in a Nigerian study in Ilorin (Nigeria) by Ayanniyi et al. (2010), which may be owing to a stricter definition of VI using visual acuity of $\leq 6/9$.

Our results indicate that visual impairment amongst school-aged children is worthy of intervention by the Ministries of Education and Health. Visual impairment is one of the most common forms of disability in children, and children with disabilities are especially disadvantaged in school enrolment, educational attainment and learning (Wodon et al., 2019). To prevent this, it is recommended that health education programmes raise awareness in the community, periodic screening programs should be organised, and primary eye care services should also be made more

available. Uncorrected refractive error was the leading cause of visual impairment among school children in the Biadan and Kato circuits. This impairment may be explained by fewer eye care facilities in the Berekum municipality; thus, accessing refractive services may be challenging. It may also be due to a lack of awareness about the symptoms and use of spectacle correction.

Besides, uncorrected refractive error is a painless visual condition, and children with it may live without complaining to their parents. Unlike children with infectious eye disease, those with uncorrected refractive error may not seek eye care. Furthermore, some parents in developing communities have misconceptions about wearing corrective lenses, and they believe children may become blind later in life if spectacles are worn earlier (Ovenseri-Ogbomo, Assien, 2010). There were similar findings in a study of school-going children in rural Tanzania by Wedner et al. (2000), where uncorrected refractive error was the leading cause of visual impairment. A study by Bezabih et al. (2017) in Ethiopia also found that refractive error was the leading cause of visual impairment in most schoolchildren. The findings from the present study could also be comparable to the study conducted in the Ashanti Region of Ghana by Kumah et al. (2013) on private school children of adolescent age. These similarities lie in the study definitions, age groups and sociodemographic status in the studies. The studies mentioned above and our findings show that refractive error is a preventable yet frequent cause of visual impairment among school children and should be monitored. It, therefore, suggests a gap in eyecare services, which may mandate the need for more refractive, affordable services. Also, children should be encouraged to wear spectacles to reduce the burden of refractive errors, parents need to be educated on the importance of spectacle correction, and the public needs to be educated to destigmatise spectacle use.

The findings from this study have demonstrated a higher prevalence of myopia, followed by astigmatism and then hyperopia. Myopia usually starts in childhood and progresses with age as one engages in more near-work, generally levelling off in the late teens or early twenties (Courtright et al., 2011). A study done among private school children in Kumasi, Ghana, found the prevalence of myopia to be 3.2 % with retinoscopy and 3.4 % with autorefraction (Kumah et al., 2013). This finding is similar to the prevalence of myopia found in the current study, and it may be due to the common definition for myopia used in both studies. The prevalence of hyperopia in this current study is lower than the prevalence (5.0 %) of hyperopia found in Ghana among children attending public and private schools in Agona Swedru (Ovenseri-Ogbomo, Assien, 2010). This could be because the previous study used cycloplegic refraction, which reveals more hyperopia in children, especially those with high accommodative amplitude. The prevalence of astigmatism found in the current study's population was much lower than in studies done in Agona-Swedru (Ovenseri-Ogbomo, Assien, 2010) and Kumasi (Kumah et al., 2013), where the prevalence of astigmatism was found, with retinoscopy, to be 6.6 % and 9.8 %, respectively. Again, the possible reason for the lower prevalence in the current study could be attributed to the larger sample sizes and geographical locations of both previous Ghanaian studies. Another contributing factor could be a difference in the study areas, as the previous Ghanaian studies were conducted in more developed areas than the current study.

Uncorrected refractive error can hamper performance at school, reduce employability and productivity, and generally impair quality of life. Yet correcting refractive errors with appropriate spectacles is among the most cost-effective interventions in eye health care. Therefore, it is suggested that refractive services must be integrated with eye care systems, and refractive corrections must be made accessible and affordable. Furthermore, the association between age and VI suggests that if the school children's age increased by one year, the odds of visual impairment decreased by 23 %. The implications for these school children translate to means younger children are vulnerable. However, this finding does not follow the report by WHO and IAPB (WHO, 2019) that visual impairment will be more with increasing age. This raises concern as visual impairment in children is more critical because of the potentially longer duration of their lives than older people. According to a report by WHO (1992), adequate human resource personnel, strengthening of infrastructure and appropriate technology are some preventive measures that can help reduce visual impairment in children. However, these factors are inadequate in the Kato and Biadan Circuits in the Berekum municipality. Therefore, introducing eye health screening programmes in preschools is recommended for early detection and to help address the issue in Ghanaian Municipalities with a similar profile to Berekum as in other LMICs.

Cataract was also found to be the single cause of visual impairment in 0.7 % of those with VI in the study population. The prevalence found in this study is similar to that found in a study done

on children in India, where the prevalence of cataracts was 0.79 % (Dandona, Dandona, 2006). These studies are comparable because of the similarity in the study areas and age groups. In Nigeria, 0.33 % of children were found to be visually impaired due to cataracts (Duke et al., 2013). The prevalence of cataracts in the present study, compared to the Nigerian study, could be due to the differences in the study definitions and methodology. The previous study used key informants to screen the children to identify the cause of visual impairment. Cataracts can delay or stop normal sight development if left untreated in children, further affecting visual performance (NHS, 2022). It can also lead to an increase in the number of blind years as children have a longer life expectancy (NHS, 2022). Cataract is an avoidable or treatable cause of visual impairment in school children that needs to be monitored. Accessible primary eye care services should also be made available, and eye health education on the need to seek prompt treatment must be intensified, especially in the case of congenital impairments which are not apparent at birth. It is also recommended that periodic school eye health screening programmes be included in the academic curricula and implemented for the early detection and treatment of eye disorders.

In addition to refractive errors and cataracts, a 0.3 % prevalence of amblyopia was found in those in the current study with visual impairment. A Ghanaian study in the Ashanti Region conducted among private school children found that amblyopia was the cause of visual impairment in 9.9 % of the population (Kumah et al., 2013). The lower prevalence in the current study could be attributed to the smaller sample size. Another reason for the difference in prevalent rates could be variations in demographics. Children in urban areas such as the Ashanti Region, where the previous study was conducted, are known to be involved in indoor activities that make them susceptible to developing refractive errors. When these errors are not diagnosed and managed early, they can lead to refractive amblyopia, the commonest type in school children. However, a similar prevalence of 0.4 % was found in a study conducted in Nigeria (Ayanniyi et al., 2010). This is comparable because of the similarity in the age of both study populations.

5. Limitations

The study was conducted in two out of eight circuits. Therefore, the results can only describe the situation in the Biadan and Kato circuits rather than generalising them to the whole municipality. Duplicating this study in all regions of Ghana may help with national statistics to inform whether these findings reflect the greater school population in Ghanaian public schools. The study was conducted among school-going children. This implies that the findings do not reflect the clinical conditions of all children in the community, as some may not be in school due to financial reasons, health problems, or blindness. Hence, all the different causes of visual impairment might not have been considered. In order to not disrupt the learning process of those with visual acuity less than or equal to $\leq 6/12$ (0.3LogMAR), only dry subjective refraction was used. Cycloplegic refraction is necessary to measure paediatric refraction because it relaxes the accommodation and prevents the overestimation of myopia and the underestimation of hyperopia.

6. Conclusion and Recommendations

The prevalence of visual impairment found in the study sample was 8.14%, with uncorrected refractive error being the leading cause amongst schoolchildren in the Biadan and Kato circuits. Age was negatively associated with visual impairment, suggesting the vulnerability of younger school children. Early detection and provision of affordable eye health services may help curb preventable visual impairment. This provides tangible evidence of the need for refractive services for young children. Furthermore, it underlines the need to create awareness and provide education, periodic screening and affordable eye care services to treat preventable visual impairment. In the absence of other existing data, the study findings could be used to advocate for communities and the government in Ghana to provide adequate vision care in the public health sector to serve vulnerable populations, such as young school children.

7. Declarations

Ethics approval and consent to participate

Ethics approval was granted by the Biomedical Research Ethics Committee (BREC) (with ID number BE401/14) of the University of Kwazulu-Natal and the Ghana Health Service Ethics

Committee (protocol ID GHS-ERC 10/10/14), with permission from the municipal education directorate and the heads of the selected schools and informed consent from parents.

Consent for publication

Not applicable.

Availability of data and materials

Data and materials associated with this study are available upon request.

Conflict of interest statement

The authors report no conflicts of interest.


Funding


Not applicable.

Acknowledgements

The authors are grateful to all who took part in the study. The paper stems from an unpublished master's thesis at the University of KwaZulu-Natal, South Africa. The study was completed in 2019.

Authors' ORCID

Elizabeth Mana Akpakli  <https://orcid.org/0000-0001-5327-6666>

Alvin Jeffery Munsamy  <https://orcid.org/0000-0003-4252-1317>

References

- [Alrasheed et al., 2016](#) – Alrasheed, S.H., Naidoo, K.S., Clarke-Farr, P.C. (2016). Prevalence of visual impairment and refractive error in school-aged children in South Darfur State of Sudan. *African Vision and Eye Health*. 75(1): a355.
- [Ayanniyi et al., 2010](#) – Ayanniyi, A.A., Mahmoud, A.O., Olatunji, F.O. (2010). Causes and prevalence of ocular morbidity among primary school children in Ilorin, Nigeria. *Nigerian Journal of Clinical Practice*. 13(3): 248-253.
- [Bezabih et al., 2017](#) – Bezabih, L., Abebe, T.W., Fite, R.O. (2017). Prevalence and factors associated with childhood visual impairment in Ethiopia. *Clinical Ophthalmology*. 11: 1941-1948. DOI: <https://doi.org/10.2147/OPHTH.S135011>
- [Courtright et al., 2011](#) – Courtright, P., Hutchinson, A.K., Lewallen, S. (2011). Visual impairment in children in middle- and lower-income countries. *Archives of Disease in Childhood*. 96(12): 1129-1134. DOI: <https://doi.org/10.1136/archdischild-2011-300093>
- [Dandona, Dandona, 2006](#) – Dandona, L., Dandona, R. (2006). What is the global burden of visual impairment? *BMC Medicine*. 4(6). DOI: <https://doi.org/10.1186/1741-7015-4-6>
- [Duke et al., 2023](#) – Duke, R.E., Lewallen, S., Courtright, P. (2023). Estimated prevalence of monocular blindness and monocular severe visual impairment in children of Cross Rivers State, Nigeria. *Nigerian Journal of Ophthalmology*. 22(2): 66-68. DOI: <https://doi.org/10.4103/0189-9171.154610>
- [Ghana Statistical Service, 2014](#) – Ghana Statistical Service. 2010 Population & Housing Census, District Analytical Report, Berekum Municipality. Accra: Ghana Statistical Service, 2014. [Electronic resource]. URL: https://www2.statsghana.gov.gh/docfiles/2010_District_Report/BrongAhafo/BEREKUMMUNICIPAL.pdf
- [Kumah et al., 2013](#) – Kumah, B.D., Ebri, A., Abdul-kabir, M., Ahmed, A., Koomson, N.Y. (2013). Refractive error and visual impairment in private school children in Ghana. *Optometry & Vision Science*. 90(12): 1456-1461.
- [Mehari et al., 2013](#) – Mehari, Z.A. (2013). A study of ocular morbidity of patients attending ophthalmic outreach services in rural Ethiopia. *International Journal of Medicine and Medical Sciences*. 3(4): 2167-404.
- [NHS, 2022](#) – NHS. Overview: Childhood cataracts, 2022. [Electronic resource]. URL: <https://www.nhs.uk/conditions/childhood-cataracts/>
- [Ovenseri-Ogbomo, Assien, 2010](#) – Ovenseri-Ogbomo, G.O., Assien, R. (2010). Refractive error in school children in Agona Swedru, Ghana. *South African Journal of Optometry*. 69(2): 86-92.
- [Ovenseri-Ogbomo, Omuemu, 2010](#) – Ovenseri-Ogbomo, G.O., Omuemu, V.O. (2010). Prevalence of refractive error among school children in the Cape Coast Municipality, Ghana. *Clinical Optometry*. 2: 59-66. DOI: <https://doi.org/10.2147/OPTO.S10583>

[Wedner et al., 2000](#) – *Wedner, S.H., Ross, D.A., Balira, R., Kaji, L., Foster, A.* (2000). prevalence of eye diseases in primary school children in a rural area of Tanzania. *British Journal of Ophthalmology*. 84(11): 1291-1297. DOI: <https://doi.org/10.1136/bjo.84.11.1291>

[Wodon et al., 2019](#) – *Wodon, Q., Male, C., Nayihouba, A., Smith, E.* (2019). Looking Ahead: Visual Impairment and School Eye Health Programs. *The Price of Exclusion: Disability and Education*. World Bank. [Electronic resource]. URL: <https://thedocs.worldbank.org/en/doc/880171575325123775-0090022019/original/WorldBankInclusiveEducationVisualImpairmentv7WebReady.pdf>

[World Health Organisation, 1992](#) – *World Health Organisation.* (1992). Prevention of childhood blindness. Geneva: World Health Organization. [Electronic resource]. URL: <https://apps.who.int/iris/handle/10665/39061>

[World Health Organisation, 2019](#) – *World Health Organization.* (2019). *World report on vision*. Geneva: World Health Organization. [Electronic resource]. URL: <https://www.who.int/news-room/detail/08-10-2019-who-launches-first-world-report-on-vision>

[World Health Organization, 2007](#) – World Health Organization. Assessment of the prevalence of visual impairment attributable to refractive error or other causes in school children. Geneva: World Health Organization, 2007.

[World Health Organization, 2013](#) – World Health Organization. Visual impairment and blindness. World Health Organization, 2013. DOI: https://doi.org/10.1007/SpringerReference_61253

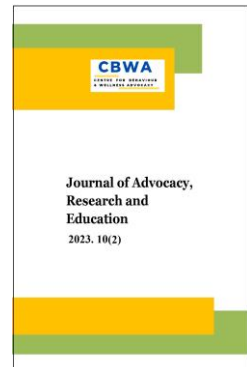
[Zelalem et al., 2023](#) – *Zelalem, M., Abebe, Y., Adamu, Y., Getinet, T.* (2019). Prevalence of visual impairment among school children in three primary schools of Sekela Woreda, Amhara Regional State, North-West Ethiopia. *SAGE Open Medicine*. 7: 205031211984976. DOI: <https://doi.org/10.1177/2050312119849769s>



Publisher: Centre for Behaviour and Wellness
Advocacy, Ghana
Co-publisher: Cherkas Global University, USA
Has been issued since 2014
ISSN 2410-4981. E-ISSN 2508-1055
2023. 10(2): 68-79

DOI: 10.13187/jare.2023.2.68

Journal homepage:
<http://kadint.net/our-journal.html>



Instructional Design to Cultivate Expert Learners Using Universal Design for Learning: An Overview

Yaqin Fan  a, *

^a Research Center for Educational Evaluation and Quality Monitoring, Tianjin Academy of Educational Science, Tianjin, China

Abstract

An expert learner is one who is knowledgeable about how learning happens. Mastering the learning method and becoming a master of learning, rather than passively accepting it, is essential for 21st-century innovative talent. Universal Design for Learning aims to establish learning objectives, tool support, material content and assessment methods appropriate for individual needs at the beginning of curriculum design, thus eliminating learning barriers for each learner as far as possible and ultimately achieving the goal of expert learners. However, there are still many problems in applying the universal learning design framework. For example, applied research rarely points out how teaching interventions correspond to Universal Design for Learning principles. Based on the framework of Universal Design for Learning, combined with the understanding of expert learners, this study systematically designs teaching cases to provide a reference for practical applications of Universal Design for Learning and the cultivation of individuals with needs.

Keywords: expert learner, instructional design, overview, universal design for learning.

1. Introduction

Universal Design for Learning (UDL) was first proposed by the Center for Applied Special Technology (CAST) in 1998 (Dalton et al., 2012). It is a framework for improving and optimising teaching and learning for all, based on scientific insights into human learning styles. It aims to tailor and adapt teaching objectives, assessments, methods and materials to meet individual needs from the beginning of curriculum design. Scientific insights into how humans learn come from a comprehensive analysis of knowledge in the fields of education, cognitive science, psychology, and neuroscience. On this basis, three design principles of UDL were proposed around three groups of human brain learning networks (i.e. Recognition Network, Strategic Network, and Affective Network) (CAST, 2023). Referable instructional design guidelines and specific suggestions based on UDL guidelines are also given, as shown in Figure 1 (CAST, 2018).

Scholars and school teachers actively try to design teaching interventions according to UDL guidelines and apply them to classroom teaching. Research results showed that UDL can improve students' academic level and learning engagement (Rao et al., 2014), further confirming the effectiveness of the UDL teaching application. However, few studies have addressed the relationship between interventions and UDL principles, that is, how interventions are designed

* Corresponding author
E-mail address: fanyq127@126.com (Y. Fan)

from UDL guidelines and how they reflect its ideas. These issues are rarely addressed in UDL-related practice articles. Although all researchers state that their application strategy is based on UDL ideas, detailed descriptions of how the components of the application strategy relate to specific principles vary widely (Min et al., 2016). Besides, no guidelines specify how the guidelines should correspond to the application strategy (Rao et al., 2014). Moreover, some UDL application cases lack specific descriptions of application strategies, further weakening their reference (Sokal, Katz, 2015; Watchorn et al., 2014).

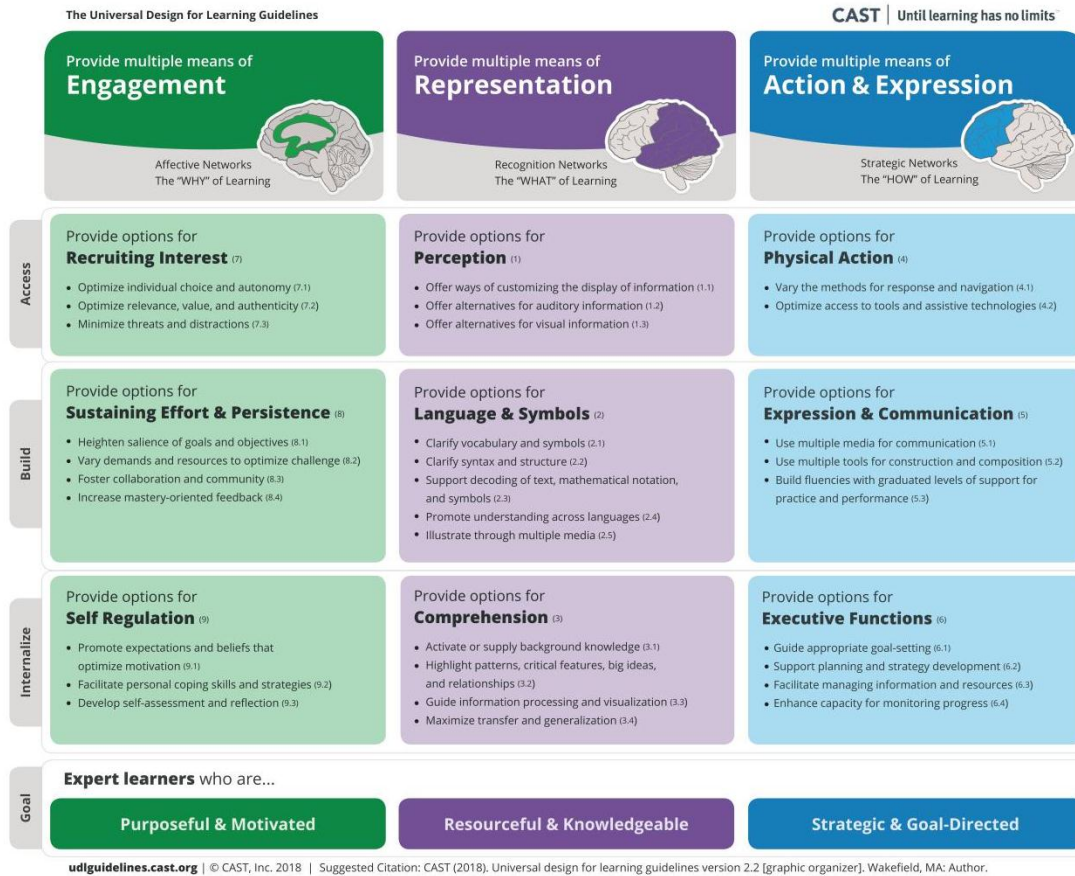


Fig. 1. Universal Design for Learning Guidelines Version 2.2

Figure 1 shows that CAST targets UDL at expert learners, that is, learners who are purposeful and motivated, resourceful and knowledgeable, strategic and goal-directed. Expert learners understand how learning happens and are good at creating conditions to support this process (Lambert, 2020). In other words, expert learners are constantly developing and motivated to learn more. Compared with novices, experts spend a lot of time in engineering practice searching for external information about the project, which novices ignore, resulting in a biased understanding of the nature of science (Peffer, Ramezani, 2019). The expert's problem-solving approach is to reason backwards from conclusions. At the same time, the novice is more inclined to reason from subjective inferences to conclusions, with different problem-solving processes and strategies. Experts adopt the scientific problem-solving process more gradually. Comparatively, novices cause problems, such as confusing sequences, merging steps, and missing processes, resulting in less clear, concise and efficient inquiry results than the former (Jeong, Kim, 2022).

Evidently, UDL understands all learners, recognises the wide range of differences among learners, and recognises all students as expert learners (Hartmann, 2015). It firmly believes that, regardless of the complexity or severity of differences and needs, everyone has the opportunity to grow as an expert learner. Although UDL considers the process of knowledge acquisition to be the growth process of expert learners, mastery of knowledge content is not the key (Dalton, 2017). According to Dalton (2017), how one understands and experiences life and transforms everyday experiences into opportunities for learning and development. One vital strength of UDL is that it transforms "one-size-fits-all" teaching into diverse and accessible learning opportunities that adapt

to changes in students (Quaglia, 2015). consciously plan multiple paths to the same learning goal, and maximise the participation of all types of students to improve education resources for all (Quaglia, 2015). However, on how to cultivate expert learners through UDL thought, the UDL guidelines only provide the framework and ideas, and the specific how to implement and develop expert learners are unclear. Thus, it is necessary to explore and analyse the connotation and characteristic development of expert learners to clarify the expert learner's development path and its relation with UDL principles.

2. Connotation, characteristics and development path of expert learners

Different authorities have offered the meaning and qualities of expert learners in several ways. Gagne believed that the core task of education is not to teach classified and systematic knowledge but to teach people the ability to think and use their reasoning ability to solve problems better (Jonassen, 2000). In 1996, UNESCO put forward the idea of "learning to learn". It was officially included in the Core Competencies and Values framework for Chinese students in 2014. It is also the core characteristic of expert learners. It is generally believed that expert learner refers to those who can learn effectively during the learning process (Rahman et al., 2010; Galkiene, Monkeviciene, 2021; Grant, Pérez, 2022). Alternatively, an expert learner is someone who can analyse, deal with problems and construct knowledge like an expert and has the characteristics of effective expert learning.

Furthermore, Ertmer and Newby described expert learners as students who are planning, controlling and reflective (Ertmer, Newby, 1996). These abilities can help them recognise skills they have or lack and then apply or acquire relevant skills using appropriate strategies. It has been pointed out that reflection on the learning process is a critical element in developing expert learners. As a result, students become aware of their learning process and can monitor and adjust their thinking strategies to improve their learning and gradually grow into expert learners. For instance, Zimmerman believed that expert learners would set reasonable learning goals for themselves and use efficient learning strategies to learn and grow in each stage of knowledge acquisition (Zimmerman, 2002).

Concerning the qualities of expert learners, Woolfolk identified three characteristics: concentration on learning material, commitment to an in-depth processing of information, and responsibility for their own learning. He believed these characteristics were not automatically constructed but achieved through deliberate planning and learning monitoring (Rahman et al., 2010). He suggested that both novice and developing expert learners need this deliberate effort and planning to build procedural knowledge on implementing and managing effective learning (Rahman et al., 2010). Similar to the views of the previous scholars, McDowell (2019) believes that expert learners understand their own learning needs, can set learning goals, and monitor their learning progress. Also, Duncan (2023), an associate professor in the Department of Cell and Developmental Biology who is passionate about improving the way science is taught, recalled her own experience of scientific inquiry and noted that expert learners can identify potential difficulties or obstacles and then seek strategies to avoid them before they arise. More importantly, they can learn from one failure to prevent similar problems in the future, even in other fields. However, due to a lack of experience, beginners are often unable to identify where errors may go, though sometimes they make mistakes. Due to a lack of awareness of the problems and failure experiences summarised, there is a high probability of making the same mistake next time.

To summarise the above scholars' understanding of expert learners in comparison to the features of expert learners in the UDL guidelines, although the wording is different, the views expressed are indeed similar. It not only further explains the understanding of the expert learner but also provides a reference for the cultivation of expert learners. Next, the three features of the expert learner in the UDL guidelines are matched to the features of the expert learner in the literature listed above, and an attempt is made to find a cultivation strategy for each feature.

Firstly, "purposeful and motivated" can be compared to "responsibility for their learning", "deliberate effort and planning", "understanding their own learning needs", and "can set learning goals" mentioned above. Expert learners can be considered active learners who are responsible for their own learning (Dalton et al., 2019). In the process of cultivation, their motives for learning will gradually change from external to internal motives, and their co-ordination, control, and primary responsibility for learning will gradually change from the external force of the teacher to the

management and responsibility of the student as the subject of learning (Sieglová, 2019). Therefore, the above-mentioned path to develop this characteristic can be summarised as “motivation arousal”.

Secondly, “resourceful and knowledgeable” can correspond to “concentration on learning material”, “knowledge construction”, “identify potential difficulties or obstacles and then seek strategies to avoid them before they arise”, and “learn from one failure to prevent similar problems in the future” mentioned above. It can be argued that expert learners should construct their cognitive structure and store knowledge in layers and categories for accurate and fast extraction (Peng, Chen, 2019). This characteristic is the biggest difference between expert and novice problem-solving. Therefore, the above-mentioned development path of this characteristic can be summarised as “cognitive construction”.

Finally, “strategic and goal-directed” can correspond to “set reasonable learning goals for oneself”, “planning, controlling and reflective”, “deliberate planning and monitoring of learning”, “can set learning goals”, and “monitor their learning progress” mentioned above. It can be considered that expert learners can monitor their learning and adjust strategies in time, and this ability is consciously cultivated rather than automatically constructed (McDowell, 2019; Schwartz, Manning, 2018). Therefore, it can be summarised as “metacognitive cultivation.”

3. Instructional Design model for expert learner cultivation from the perspective of UDL

Expert learners are the ultimate goal of UDL. The above describes the connotations of the UDL and features of expert learners, respectively. However, specific planning and design are still required between the two. Then, in the previous section of this study, the two were matched, and in the process, attempts were made to discover strategies for developing each trait of the expert learner. Drawing this cultivation path forms the instructional design model, as shown in Figure 2.

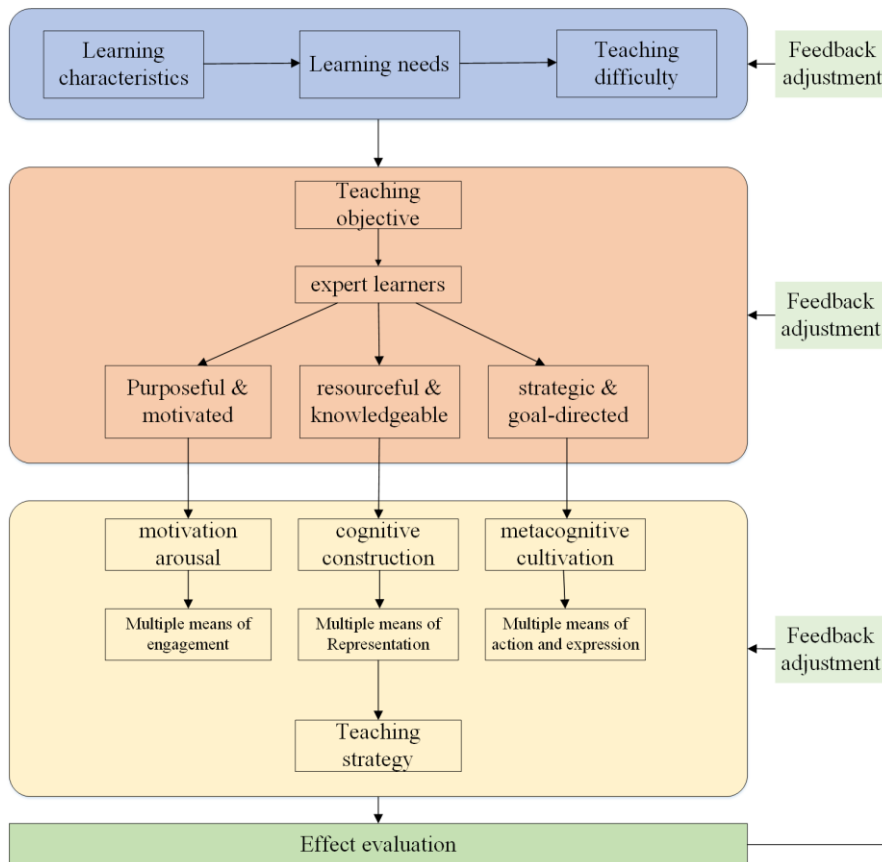


Fig. 2. An instructional design model for expert learner cultivation from a UDL perspective

This model starts with the learning needs of students, the cultivation of expert learners as the goal, the teaching strategy as the means, the effect evaluation as the starting point of the next round of teaching design to carry out the teaching design work, aiming at building flexible, independent, and supportive teaching strategies, as far as possible for every student to build scaffolding, meet learning needs and improve the quality and efficiency of learning.

The acquisition of learning needs

Learning needs acquisition is the first and key step in instructional design (Yatim et al., 2021). Only with an accurate and comprehensive understanding of a student's learning disability in a particular learning content can we design targeted teaching strategies. Learning needs are related to the content of learning itself and the student's own level of learning, intelligence, interest in learning, and other characteristics (Chiu et al., 2023). Therefore, to obtain specific information about learning needs, we should consider both perspectives of student learning characteristics and teaching content comprehensively. In terms of students' learning characteristics, students' growth environment, personality characteristics, interests, learning ability and other characteristic information can be obtained through questionnaires, interviews between teachers and students, classroom observation, self-summary of students, home visits of teachers and other ways (Permana, Utomo, 2021), and try to classify and summarise them from three aspects of human brain emotional network, recognition network and strategic network. In terms of teaching content, teachers can gather and summarise student learning difficulties and possible learning needs through their own teaching experiences, peer communication and online resources.

Teaching objectives

In contrast to traditional teaching objectives, this model focuses more on cultivating expert learners, emphasising that students should learn how to learn actively and become masters of learning rather than passively accepting. Compared to the two, the teaching objective of the expert learner is a further improvement over the one of traditional teaching. According to the above analysis and exploration of expert learners, expert learners can be described from three perspectives: motivation, cognition, and metacognition. In the design of a particular teaching case, the teaching objectives should be specifically and pertinently set according to the chapter content and the individual learning levels of the students.

Teaching strategies

Teaching strategy design is at the core of expert learner cultivation. As can be seen from the above and Figure 2, the purpose of "diversified participation methods" in UDL is to arouse students' learning motivation, especially intrinsic motivation. The purpose of "diversified presentation" is to promote students' absorption, internalisation and construction of knowledge content. The aim of "Diverse Behaviors and Expression" is to provide students with the opportunity and means to plan, monitor, regulate and reflect on their learning process. In this regard, the UDL guidelines propose specific ideas and methods to motivate student engagement in learning, promote knowledge construction, and foster metacognitive skills from three aspects: access, construction, and internalisation, as shown in Figure 1. This is certainly the basis and reference for teachers to implement UDL teaching and can create the environment and conditions for the development of expert learners. But the subject of learning is the student, and learning is ultimately about what happens to the student (Billett, 2010). In developing expert learners, scaffolding needs to be built to help students improve their learning skills in the immediate development zone (Reiser, 2018).

For the design and construction of scaffolding, we can learn from the "Five Why Method" in the field of problem-solving, also known as the "Five Questions Method", from the perspective of "motivation arousal." It is a self-questioning method used to solve practical problems, analyse, and investigate the causes of problems (Lin, Chang, 2022). It can be used to keep students asking questions about their motivation to learn, gradually finding out why they dislike learning and exploring why they want to learn. In terms of "cognitive construction", cultivation can be carried out by drawing cognitive maps. A cognitive map shows the inner mental model in a visual way, aiming to store knowledge in hierarchical classification and construct one's own knowledge context (Behrens et al., 2018; Sarah, 2019). In terms of "metacognitive cultivation", teaching can be carried out from the perspective of cultivating students to formulate learning objectives, plan the learning process and monitor learning effects.

Effect evaluation

The purpose of the evaluation is not to test the effectiveness of teaching but to obtain feedback necessary to improve teaching. Corresponding to the teaching objective, the effectiveness assessment in this study refers to the assessment of the achievement of the expert learner objective and the curriculum content objective. Specifically, it refers to the detection of student achievement of personalised goals and the improvement of goal setting based on the detection results. The subject of the assessment can be the teacher; that is, the teacher needs to make an objective and comprehensive assessment and grasp the achievement of the student's goals. It can be the student himself, i.e. the student needs to develop the ability to understand himself correctly. It can also be peer-to-peer, that is, peer-to-peer supervision and feedback. The assessment method should be the comprehensive application of summative and formative assessments, focusing on assessing students' learning ability and process.

4. Teaching case design for expert learner cultivation from a UDL perspective ***Acquisition and analysis of learning needs***

The Qingdao version of Seventh-Grade Mathematics, Chapter 7, Section 7.3, provides the first lesson of solving equations with one variable. The learning disability acquisition methods are mainly based on teacher summaries and references from online resources, and the specific contents are summarised as follows: ① The deformation of the equation is written as a continuous equality; ② When removing the denominator, the term without the denominator is omitted; ③ The polynomials on the score line are not bracketed after removing the denominator; ④ Do not pay attention to the rule of eliminating parentheses or missing multiplications when removing parentheses; ⑤ Change the number when transferring, or confuse the offset with the reduction; ⑥ When the same terms on both sides of the equation cancel, write the term that should be cancelled as "1"; ⑦ When the unknown coefficient is 1, the numerator and denominator are inverted; ⑧ 0 times a number equals that number; ⑨ Confusing the fundamental properties of fractions and equations.

Most of the learning needs mentioned above are caused by a fuzzy understanding of the equation-solving process, which belongs to an insufficient grasp and application of procedural knowledge of the problem-solving strategy. They belong to the "strategy network" of the human brain, corresponding to the third principle of UDL, namely, diversified behaviours and expressions. The lack of mastery and application of the strategy can be attributed to students' lack of understanding of the knowledge structure in this chapter, the failure to build a systematic knowledge network, and the failure to store knowledge in a hierarchical classification. As a result, problems such as extraction errors and confusion arise when knowledge is extracted. Again, the reason can be attributed to the fact that the student's objective in mathematics learning is unclear, and supervision is not strict, resulting in poor learning. Finally, from a motivation point of view, the reasons can be attributed to the lack of motivation of students to learn mathematics, the lack of a strong interest and inclination to learn mathematical knowledge, the failure to find the joy of mathematics learning, and the failure to experience their value in learning mathematics. Taken together, the above reasons can be attributed to the following assumptions: the storage of mathematical knowledge by students is not systematic and disorganised; mathematical learning objectives are unclear; there is no learning plan, and learning is not ideal; the motivation for mathematical learning is insufficient, and the goal is not strong.

Analysis and setting of the learning objective

The learning objective setting will be divided into two parts: the expert learner objective and the personalised objective. The former is an average standard for reference, while the latter is individualised for each student.

In this case, the goals of expert learners are set as follows: (1) to explore their interest in equation deformation law and their achievement in learning; ② Try to construct the knowledge network diagram of this lesson and the knowledge learned in this chapter and even this semester. The transfer rule and the specific process of summing up the unknown coefficients to one are summarised, and its relation to existing knowledge is analysed; ③ Learn to make learning plans, objectives, and timely monitor their learning progress and efficiency.

The setting of personalised goals should be based on individual factors such as the student's level of learning, which is appropriate for their area of recent development. High or low target expectations can reduce interest in learning. Goals can be set by both students and teachers. In the early stages, the teacher can lead the setting and gradually develop the student's ability to set goals so that the student can objectively understand his own learning level and ability to learn, and in the later stages, the student can set goals on his own.

Analysis and design of teaching strategies

Based on the acquisition and analysis of student learning needs in this chapter, the design idea of the teaching strategy will be carried out from three aspects: increasing motivation, planning learning, and mapping knowledge networks. To increase motivation, design should be carried out from the perspectives of optimising individual choice, improving autonomous ability, highlighting learning objectives and encouraging self-reflection (Pintrich, 2003; Wardani et al., 2020). The plan will be designed from the perspective of setting goals and learning plans, process monitoring, etc. (Hariri et al., 2021). The mapping of knowledge networks will be done from the perspective of simplifying the layout design of learning content, highlighting key information, visualising the presentation of knowledge content, and providing video learning materials (Flanagan et al., 2019; Ho et al., 2018). The following will be detailed regarding instructional preparation, task assignment, exploration rules, consolidation exercises, and introspective summaries.

The teaching materials to be prepared include the following contents: ① handout materials: redesign the teaching contents of this class according to the principles of concise layout, highlighting key information and emphasising correlation. ② Video explanation: prepare the video learning materials for the lesson. ③ Micro-video: according to the knowledge content, the video should be divided into several micro-videos. ④ Text explanation: prepare the text to explain the video content. ⑤ Knowledge structure chart: draw the knowledge structure chart of this lesson and mark its position in this chapter. ⑥ Background knowledge activation materials: provide interesting math stories related to the knowledge content of this lesson. ⑦ Cards: prepare cards marked with 0-9 and mathematical operation symbols. ⑧ Teaching process: a brief introduction to the main teaching process of this section. ⑨ Teaching objectives: define this lesson's learning objectives and expected results. ⑩ Assessment: Clarify the assessment methods and requirements for this class. The UDL principle embodied therein is mainly multiple means of representation, which are concretely reflected in multiple representation types of information content, highlighting key features, key points and their interrelationships, and explaining using multimedia.

Teachers' activities during the assignment phase are mainly divided into the following: the distribution of learning materials; informing students of the lesson's learning objectives, learning plan, and learning outcomes; based on the objectives, plans, and achievements of the class, each student is assigned to develop his/her own learning schedule for the class, including time, content, and outcomes, and is timely reminded of the completion of learning tasks along the way. Also, student activities are divided into the following phases: browsing for learning materials; setting learning goals that are appropriate for one's own learning level, and making a study plan. The UDL principles embodied therein are further categorised as follows: ① providing multiple means of representations, which are embodied in informing the learning objectives and the types of achievements in highlighting the learning objectives; ② providing multiple means of action and expression, which are embodied in guiding the setting of appropriate goals; helping with study planning; encouraging, guiding and monitoring the learning process.

During the exploratory rule phase, teachers' activities are divided into distributing cards, allowing students to freely combine the cards to form multiple univariate equations, and writing the combined equations in a notebook. Also, it includes encouraging students to work in groups or independently to explore their combinations of equation-solving processes, thinking about what your solution basis, idea, process is, articulating it and writing it down; checking whether the solution is correct and reasonable within the group, and summarising the rules; teachers observe the problem-solving process of each group and give timely instructions to solve the problem; the teacher summarises the student's problem-solving rules and explains the concepts, functions, and steps of the transfer rules and unknown coefficients into 1. Student activities can be divided into combining cards to form multiple types of linear equations with one unknown; analysing the

characteristics, differences, and similarities of different equations; exploring the solving procedures for linear equations with one unknown by groups or independently; checking the solution process peer to peer; reflecting on the solution process, summarising the existing knowledge used and exploring the laws of solving linear equation with one unknown; a complete and detailed description of the solution process and visualising the problem-solving process. The UDL principles embodied therein are as follows: ① providing multiple means of engagement, which are embodied in the free combination of cards to improve students' subjective participation and selectivity; cooperation and independent learning are encouraged to give freedom and flexibility in the way of learning; real-time feedback to improve the effectiveness of feedback; ② providing multiple means of representation, which are embodied in drawing the knowledge network diagram, visualising the problem-solving process, and understanding the correlation between different knowledge further.

The activities of the teacher during the consolidation exercise phase are mainly divided into encouraging students to solve the first exercise. Teachers inspect students to solve problems and give timely instruction. They allow group collaboration and self-inquiry in various ways and encourage students to solve the second exercise. The teacher inspects students to solve problems and gives timely guidance. Allow group work and self-inquiry in a variety of ways. The activities of the students are further divided into encouraging the students to solve the first exercise. For example, students are encouraged to consider whether it is hard to solve, where the difficulty lies, and what knowledge points relate to it. Students, during activities, are made to review and resolve these points. If the equation is solved smoothly, analyse the characteristics of the equation and the solution idea, reflect on the knowledge used in solving the equation, and ask if there are still doubts about the equation; encourage students to solve the second exercise. Reflect in the same way. The UDL principles embodied therein are as follows: ① providing multiple means of engagement, which is incorporated in encouraging reflection; ② providing multiple means of representation, which is also embodied in encouraging the exploration of the correlation between knowledge.

Additionally, the teacher's activities in the introspective summary phase include encouraging and guiding students to reflect on learning and summarising the common learning problems and their solutions. Students' activities further enable learners to reflect on whether they have grasped the learning objectives. If they master it, they are required to summarise their learning experience of the lesson. If not fully grasped, analyse what knowledge is not captured, what the problem is, and what the cause is; what questions should be addressed in the next class to improve learning efficiency, etc.; whether the learning plan of this class is carried out according to the plan; whether the learning plan is in line with my learning level and habits; whether I need to make adjustments. The UDL principles embodied therein are mainly as follows: ① providing multiple means of engagement, which is embodied in encouraging self-assessment and reflection on the learning process; ② providing multiple means of action & expression, which is incorporated in comparing learning objectives with learning outcomes, highlighting learning efficiency, and promoting students to monitor and adjust the learning process.

Evaluation and feedback of learning effects

On the one hand, evaluating the student's learning effect should test whether the student's learning objectives and plans are reasonable and can be effectively completed. On the other hand, it is necessary to check whether the student's knowledge, methods, and motivation meet the desired requirements. Pay attention to self-comparison and longitudinal investigation from the individual's own point of view; that is, avoid horizontal comparison from the point of view of others (Peteros et al., 2019; Syaifuddin, 2020). Assessment methods can be adopted in two ways: one is analysing and examining the completion of learning objectives and learning plans, and the other is assigning learning tasks to consolidate and examine students' knowledge mastery. The assessment subjects can firstly be self-assessment, then investigate and learn among peers, and finally make a summary evaluation supplemented by the teacher.

5. Conclusion

Compared to traditional teaching designs, the teaching strategies designed by this research could be more autonomous and optional, with more diverse learning support. Furthermore, it provides guidelines for clearer learning objectives, more emphasis on process evaluation, and

clearer learning content. Nevertheless, instructional design does not apply all the guidelines in UDL nor meet all the learning needs of every learner in the class. On the one hand, learning needs cannot be exhausted or fully explored; on the other hand, the design and production of learning support needs to be continuously revised and improved to more effectively meet the needs of students. The shortcoming of this study is that it fails to collect the learning needs of each student, nor does it provide targeted interactive tool support based on each learning disability. Instead, it designs a universal strategy based on the three principles of UDL. Future studies should focus on the suitability and individuation of learning disability acquisition and strategy formulation, as well as the effectiveness and existing problems of strategies in actual teaching, to provide ideas for revising and improving teaching design.

6. Recommendation

Each student is unique, born into different families, exposed to different groups of people, with different personalities, learning habits and styles, etc. These are worthy of consideration in curriculum and instruction design. Every individual with differences should be the focus of teaching, not the illusory unified “average” individual (Hollingshead et al., 2022). Based on this understanding, UDL tries to meet learners’ diverse needs and preferences as much as possible, thus improving the quality and efficiency of learning. This is also the core idea of UDL. UDL is an instructional design framework and an unsatisfiable ideal state. Key to its implementation is the design and development of corresponding application strategies. At present, this work is still in its infancy, and most of it is developed individually by teachers according to the learning needs of the class. Besides, problems such as unsystematic, unspecific, and weak references have to be fixed (AlRawi, AlKahtani, 2022; Rao et al., 2014).

The following suggestions can be referred to:

The teaching application of UDL should build a community of teachers and invite relevant departments, such as educational institutions, enterprises and institutions, to participate in developing strategies (Orndorf et al., 2022). According to the characteristics of the application object, systematically organise and classify.

The developed application strategy improves the generalizability of UDL application cases (Torres, Rao, 2019). The relationship between application strategies and the three principles of UDL is clearly described, which facilitates further in-depth research by researchers on UDL applications. References and references from other teachers’ concrete application strategies (Ok et al., 2017; Rao et al., 2020), which are conducive to the application of strategies in the classroom, improve the value of reference and provide a starting point for UDL application evaluation (Cook, Rao, 2018).

7. Declarations

Ethics approval and consent to participate

Ethics approval was granted by the Tianjin Academy of Educational Science, China, with informed consent from all participants.

Consent for publication

Not applicable.

Availability of data and materials

Data and materials associated with this study are available upon request.

Conflict of interest statement

The authors of the manuscript declare that there is no conflict of interest, and all reference materials were duly acknowledged.

Funding

The study was funded by the National Education Science Plan 2022 youth project of the Ministry of Education “Development and application of value-added evaluation system for Scientific Literacy-Taking rural high school students as an example” (Project Approval Number: ECA-220-552) from China. The study was completed in 2025.

Acknowledgements

The paper is one of the achievements in the course of the project development. The name of the project is Development and Application of Value-added Evaluation System for Scientific Literacy-Taking Rural High School Students as an Example (Project Approval Number:ECA-220-

552), funded by the National Education Science Planning project from China. The study was completed in 2023.

Authors' ORCID

Yaqin Fan  <https://orcid.org/0000-0001-7536-8908>.

References

- AlRawi, AlKahtani, 2022 – AlRawi, J.M., AlKahtani, M.A. (2022). Universal design for learning for educating students with intellectual disabilities: A systematic review. *International Journal of Developmental Disabilities*. 68(6): 800-808.
- Behrens et al., 2018 – Behrens, T.E., Muller, T.H., Whittington, J.C., Mark, S., Baram, A.B., Stachenfeld, K.L., Kurth-Nelson, Z. (2018). What is a cognitive map? Organising knowledge for flexible behavior. *Neuron*. 100(2): 490-509.
- Billett, 2010 – Billett, S. (2010). Lifelong learning and self: Work, subjectivity and learning. *Studies in Continuing Education*. 32(1): 1-16.
- CAST, 2018 – CAST. Universal Design for Learning Guidelines version 2.2. 2018. [Electronic resource]. URL: <http://udlguidelines.cast.org>
- CAST, 2023 – CAST. About Universal Design for Learning. 2023. [Electronic resource]. URL: <http://https://www.cast.org/impact/universal-design-for-learning-udl>
- Chiu et al., 2023 – Chiu, W.Y., Liu, G.Z., Barrett, N.E., Liaw, M.L., Hwang, G.J., Lin, C.C. (2023). Needs analysis-based design principles for constructing a context-aware English learning system. *Computer Assisted Language Learning*. 36(1-2): 176-204.
- Cook, Rao, 2018 – Cook, S.C., Rao, K. (2018). Systematically applying UDL to effective practices for students with learning disabilities. *Learning Disability Quarterly*. 41(3): 179-191.
- Dalton et al., 2012 – Dalton, E.M., McKenzie, J.A., Kahonde, C. (2012). The implementation of inclusive education in South Africa: Reflections arising from a workshop for teachers and therapists to introduce Universal Design for Learning. *African Journal of Disability*. 1(1): 1-7.
- Dalton et al., 2019 – Dalton, E.M., Lyner-Cleophas, M., Ferguson, B.T., McKenzie, J. (2019). Inclusion, universal design, and universal design for learning in higher education: South Africa and the United States. *African Journal of Disability*. 8: 519.
- Dalton, 2017 – Dalton, E.M. (2017). Beyond universal design for learning: Guiding principles to reduce barriers to digital & media literacy competence. *Journal of Media Literacy Education*. 9(2): 17-29.
- Duncan, 2023 – Duncan, M.C. (2023). A practical guide to expert learner skills in the research environment. *Molecular Biology of the Cell*. 34(5): 1-4.
- Ertmer, Newby, 1996 – Ertmer, P.A., Newby, T.J. (1996). The expert learner: Strategic, self-regulated, and reflective. *Instructional Science*. 24(1): 1-24.
- Flanagan et al., 2019 – Flanagan, B., Majumdar, R., Akçapınar, G., Wang, J., Ogata, H. (2019). Knowledge map creation for modeling learning behaviors in digital learning environments. In *Companion Proceedings of the 9th International Conference on Learning Analytics and Knowledge (LAK'19)* (pp. 428-436). Society for Learning Analytics Research (SoLAR).
- Galkiene, Monkeviciene, 2021 – Galkiene, A., Monkeviciene, O. (2021). Improving inclusive education through universal design for learning (p. 323). Springer Nature.
- Grant, Pérez, 2022 – Grant, K., Pérez, L. (2022). DIVE into UDL: Immersive practices to develop expert learners. International Society for Technology in Education.
- Hariri et al., 2021 – Hariri, H., Karwan, D.H., Haenilah, E.Y., Rini, R., Suparman, U. (2021). Motivation and learning strategies: Student motivation affects student learning strategies. *European Journal of Educational Research*. 10(1): 39-49.
- Hartmann, 2015 – Hartmann, E. (2015). Universal design for learning (UDL) and learners with severe support needs. *International Journal of Whole Schooling*. 11(1): 54-67.
- Ho et al., 2018 – Ho, V.W., Harris, P.G., Kumar, R.K., Velan, G.M. (2018). Knowledge maps: A tool for online assessment with automated feedback. *Medical Education Online*. 23(1): 1457394.
- Hollingshead et al., 2022 – Hollingshead, A., Lowrey, K. A., Howerly, K. (2022). Universal design for learning: When policy changes before evidence. *Educational Policy*. 36(5): 1135-1161.

- Jeong, Kim, 2022 – Jeong, A., Kim, H.Y. (2022). Identifying critical thinking skills used by experts versus novices to construct argument maps in a computer-aided mapping tool. *Knowledge Management & E-Learning*. 14(2): 125-149.
- Jonassen, 2000 – Jonassen, D.H. (2000). Toward a design theory of problem solving. *Educational Technology Research and Development*. 48(4): 63-85.
- Lambert, 2020 – Lambert, R. (2020). Increasing access to universally designed mathematics classrooms. Policy Analysis for California Education, PACE.
- Lin et al., 2022 – Lin, P.C., Hou, H.T., Chang, K.E. (2022). The development of a collaborative problem solving environment that integrates a scaffolding mind tool and simulation-based learning: An analysis of learners' performance and their cognitive process in discussion. *Interactive Learning Environments*. 30(7): 1273-1290.
- McDowell, 2019 – McDowell, M. (2019). Developing expert learners: A roadmap for growing confident and competent students. Corwin Press.
- Ok et al., 2017 – Ok, M.W., Rao, K., Bryant, B.R., & McDougall, D. (2017). Universal design for learning in pre-k to grade 12 classrooms: A systematic review of research. *Exceptionality*. 25(2): 116-138.
- Ok et al., 2017 – Ok, M.W., Rao, K., Bryant, B.R., McDougall, D. (2017). Universal design for learning in pre-k to grade 12 classrooms: A systematic review of research. *Exceptionality*. 25(2): 116-138.
- Orndorf et al., 2022 – Orndorf, H.C., Waterman, M., Lange, D., Kavin, D., Johnston, S.C., Jenkins, K.P. (2022). Opening the Pathway: An Example of Universal Design for Learning as a Guide to Inclusive Teaching Practices. *CBE—Life Sciences Education*. 21(2): ar28.
- Peffer, Ramezani, 2019 – Peffer, M.E., Ramezani, N. (2019). Assessing epistemological beliefs of experts and novices via practices in authentic science inquiry. *International Journal of STEM Education*. 6: 1-23.
- Peng, Chen, 2019 – Peng, Y.P.M., Chen, C.C. (2019). The effect of instructor's learning modes on deep approach to student learning and learning outcomes. *Educational Sciences: Theory & Practice*. 19(3): 65-85.
- Permana, Utomo, 2021 – Permana, D., Utomo, U. (2021). Learning needs analysis: thematic teaching book based on HOTS assisted with 3D stereoscopic images to improve critical thinking ability of elementary school students. *International Journal for Educational and Vocational Studies*. 3(2): 116-123.
- Peteros et al., 2019 – Peteros, E., Gamboa, A., Etcuban, J.O., Dinauanao, A., Sitoy, R., Arcadio, R. (2019). Factors affecting mathematics performance of junior high school students. *International Electronic Journal of Mathematics Education*. 15(1): em0556.
- Pintrich, 2003 – Pintrich, P.R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*. 95(4): 667.
- Quaglia, 2015 – Quaglia, B.W. (2015). Planning for student variability: Universal design for learning in the music theory classroom and curriculum. *Music Theory Online*. 21(1): 1-22.
- Rahman et al., 2010 – Rahman, S., Mahmud, Z., Yassin, S., Amir, R., Ilias, K.W. (2010). The development of expert learners in the classroom. *Contemporary Issues in Education Research*. 3(6): 1-8.
- Rao et al., 2014 – Rao, K., Ok, M.W., Bryant, B.R. (2014). A review of research on universal design educational models. *Remedial and Special Education*. 35(3): 153-166.
- Rao et al., 2020 – Rao, K., Ok, M.W., Smith, S.J., Evmenova, A.S., Edyburn, D. (2020). Validation of the UDL reporting criteria with extant UDL research. *Remedial and Special Education*. 41(4): 219-230.
- Reiser, 2018 – Reiser, B.J. (2018). Scaffolding complex learning: The mechanisms of structuring and problematising student work. In *scaffolding* (pp. 273-304). Psychology Press.
- Sarah, 2019 – Sarah, G. (2019, July). Cognitive Maps, mind maps, and concept maps: Definitions. [Electronic resource]. URL: <https://www.nngroup.com/articles/cognitive-mind-concept/>
- Schwartz, Manning, 2018 – Schwartz, M., Manning, P. (2018). Expert learning for law students. Carolina Academic Press.
- Sieglová, 2019 – Sieglová, D. (2019). From motivation to successful learning: Needs analysis for effective teaching. *Language Learning in Higher Education*. 9(2): 429-443.

[Sokal, Katz, 2015](#) – Sokal, L., Katz, J. (2015). Effects of the three-block model of universal design for learning on early and late middle school students' engagement. *Middle Grades Research Journal*. 10(2): 65-82.

[Syarifuddin, 2020](#) – Syarifuddin, M. (2020). Implementation of authentic assessment on mathematics teaching: Study on junior high school teachers. *European Journal of Educational Research*. 9(4): 1491-1502.

[Torres, Rao, 2019](#) – Torres, C. Rao, K. (2019). Universal design for learning (UDL) for language learners. CAST Publishing.

[Wardani et al., 2020](#) – Wardani, A.D., Gunawan, I., Kusumaningrum, D.E., Benty, D.D.N., Sumarsono, R.B., Nurabadi, A., Handayani, L. (2020, November). Student learning motivation: A conceptual paper. In *2nd Early Childhood and Primary Childhood Education (ECPE 2020)* (pp. 275-278). Atlantis Press.

[Watchorn et al., 2013](#) – Watchorn, V., Larkin, H., Ang, S., Hitch, D. (2013). Strategies and effectiveness of teaching universal design in a cross-faculty setting. *Teaching in Higher Education*. 89(5): 1-20.

[Yatim et al., 2021](#) – Yatim, S.S.K.M., Saleh, S., Zulnaidi, H. (2021). ICT-based teaching aid materials in rural high school additional mathematics learning: Needs analysis. *Malaysian Journal of Education*. 46: 1-10.

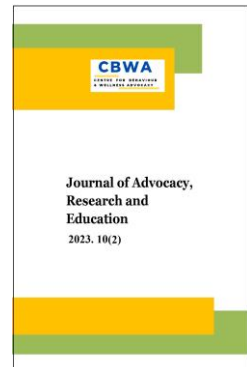
[Zimmerman, 2002](#) – Zimmerman, B.J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*. 41(2): 64-70.



Publisher: Centre for Behaviour and Wellness
Advocacy, Ghana
Co-publisher: Cherkas Global University, USA
Has been issued since 2014
ISSN 2410-4981. E-ISSN 2508-1055
2023. 10(2): 80-92

DOI: 10.13187/jare.2023.2.80

Journal homepage:
<http://kadint.net/our-journal.html>



Spirit World and Wealth Creation: Theological Reflections on Pastoral Care for Sakawa Victims at the Patmos Prayer and Retreat Center, Ghana

Enoch Kwame Tham-Agyekum ^{a,*}, Martin Obeng^b, Isaac Boamah^b

^a Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

^b Trinity Theological Seminary, Legon-Accra, Ghana

Abstract

The study was structured to understand internet fraud cult practices, popularly called *sakawa* among young people in Ghana, with a particular focus on pastoral care offered at the Patmos Prayer and Retreat Centre, Akropong. The study relied mainly on the use of qualitative research methods. The purposive sampling technique was used to select all the respondents: pastoral caregivers and a former *sakawa* victim. Content analysis was used to analyse the data collected from the respondents. The study found that *sakawa* generally involves engagement in occultic practices for wealth, influence, power, fame and favour. The root cause of involvement in *Sakawa* is the insatiable desire or quest for wealth. Most of the victims are normally lured in by their peers and friends. As a result of unemployment, financial constraints are also a major cause of involvement in *sakawa*. Victims make certain sacrifices to become partakers of the 'blessings' of *sakawa*. There are dire spiritual consequences for breaching *sakawa* instructions. Participants of *sakawa* only seek help when they realise they are in danger or when it turns out that they cannot meet certain demands being placed on them. Post-deliverance counselling for victims of *sakawa* is the only way their faith in Christ can be sustained. These activities must include referrals to other specialists to seek medical, psychological, vocational and financial assistance. The study recommends that Churches educate their young people to use the internet and other modern technology for godly purposes.

Keywords: Akropong-Akuapem, pastoral care, Patmos Prayer and Retreat Center, Sakawa, spirit world, wealth creation.

1. Introduction

In 1964, the Canadian Communication theorist Marshall McLuhan coined the expression 'global village' to describe the increasing interconnectedness of societies fueled by electronic communication. The world construed as a "global village" is now a cliché. Since then, there has been an upsurge in the use of Information and Communication Technologies (ICTs), especially internet service activities across the globe. This phenomenon has undoubtedly brought rapid development to many nations. Despite the positives, the upsurge of internet connectivity and access has also brought with it an evolution of a phenomenon which constitutes not just a threat to the security of many nations but also has huge implications for other sectors of society, including the church (Sinrod, Reilly, 2000). In Ghana, the phenomenon is called *Sakawa* (Boateng et al., 2011).

* Corresponding author

E-mail address: ektagyekum@knust.edu.gh (E.K. Tham-Agyekum)

Sakawa is also referred to as '419' in Nigeria (Armstrong, 2011). It is a Hausa Language which means 'put inside'. In Nigeria, it came to the limelight in the 1990s. Initially, it was more of an internet fraud activity involving using credit cards for online shopping. Since then, its scope has widened with the aid of a computer to include identity theft, fake security software, credit card fraud, click fraud, cyber-squatting and stock schemes (Black, Hawk, 2010). Internet crime is committed when the perpetrator develops a scheme using the internet to deprive someone of property, estate or right by a false representation or concealing information. Most people engaged in the act claim that ordinary internet fraud no longer yields the desired result, so they seek the help of spiritualists to use charm to hypnotise their clients (Jaap-Henk, Bart, 2007).

Most of the *Sakawa* victims cannot own properties or any permanent fixed assets, but if they defy the rules and own landed properties, they can only enter the building walking backwards. The consequences of violating these rules include losing all the wealth, developing a mental problem or dying. These rituals endow *Sakawa* boys with the spiritual power to possess the minds of foreign fraud victims to extract quick and easy money by browsing the internet (Danquah, Longe, 2011; Mohammed et al., 2019). Its presence was first reported in Ghana between 1999 and 2000, primarily related to credit card fraud, just as in Nigeria.

Ghana has recently come to be recognised as a central hub for internet fraud activities, being one of the top ten cybercrime-generating states worldwide, along with Anglophone African neighbours Nigeria and Cameroon. The major internet fraud activities in Ghana include false identity, where criminals use social network sites like Facebook and internet dating sites to defraud their victims, fake gold dealers, and estate fraud. The recent trend is using spiritual powers to defraud victims in cyberspace. Spiritual and magical powers are consistently being used to perpetuate false wealth. They closely collaborate with indigenous spiritual knowers, such as herbalists or "native doctors" (Danquah, Longe, 2011). The process for acquiring the powers to defraud is often dangerous, not for the faint-hearted, since the instructions must be followed to the last detail; the powers can fail and destroy the would-be wealthy person. Many strange instructions will be given to the seeker of wealth, which must be carefully followed, no matter how strange they sound (Danquah, Longe, 2011).

The youth in every society is of great importance and concern because they are considered the leaders of tomorrow. They are considered investments, the bedrock on which society develops and future leaders with the potential to stimulate economic, social and national transformation. A sizeable number of cyber criminals or fraudsters in Ghana fall within the youthful age. Most who browse the internet are adolescents and constitute the perpetrators of internet crimes. Internet crime is on the increase in Ghana as the youth are engaged in it. The Ghana Police Service indicates that internet crime suspects are mostly youth aged between 20 and 25. The youth supposed to be in school are instead engaged in internet fraud, locally termed *sakawa* (Oduro-Frimpong, 2011).

The youth have discovered different ways of using the internet for different types of criminal activities. The incident can rightly be said to be increasing in the country. Although some people's knowledge of the internet is observably just for chatting with their friends and getting information, most of them may be unable to protect their data, information, and computers from malicious programmers. These young people can benefit their families, churches and society if their potential is developed or empowered for national development. Therefore, any country that ignores the welfare, socioeconomic values and development of the youth in technology could jeopardise their future and survival (Oduro-Frimpong, 2011; Wall, 2010). One of the realities prevailing among most Africans, including Ghanaians, is the belief that the spirit world is the true source of material wealth. In particular, many people believe that no one can succeed in their career, whether in crime or legitimate professions, without securing divine blessings, first and foremost, from spiritual beings (Duah, Kwabena, 2015). Hence, the practice of *sakawa* seems legitimate in the minds of many young people involved.

In *sakawa*, the victims deploy offline spiritual beliefs and practices to acquire wealth through online channels. They use the internet to deprive another person of property, estate or right by a false representation or concealing information. Most of them claim that ordinary internet fraud no longer yields the desired result, so they seek the help of spiritualists to use charm to hypnotise their clients. They use magical powers to defraud foreign victims or possess their minds to extract quick and easy money. The spirits also serve as "spiritual insurance" so that no harm may befall them while carrying out their activities (Oduro-Frimpong, 2011).

The upsurge of internet activities has certainly negatively affected participants, homes and families, society and the world. Christian youth are also riding on the back of economic depression to engage in these illegal and spiritually unsafe activities to boost their economic fortunes. The churches' lack of sound teaching on money, acquisition of wealth, prosperity gospel, get-rich-quick-schemes, and internet fraud have all contributed to the increased engagement in *sakawa*. While these people come back to pay their fat tithes and still remain active members of our churches, it has crippled the churches' voice on this menace. While there is a dearth of empirical studies on this topic, most have focused on social, economic, religious and educational implications. While some of these studies have implicitly observed the spiritual dimension of cyber-fraud, there is currently not much theological reflection on the subject, thus, the pastoral care for *Sakawa* victims.

Research Questions

The study was guided by the following research questions:

- Why do young people enter into *sakawa*?
- What is the process for acquiring and sustaining wealth through *sakawa*?
- What are the effects of engaging in *sakawa*?
- What pastoral care strategies are used at the Patmos Centre for *sakawa* victims (before, during and after)?

2. Methods

The research design used was a case study that relied mostly on qualitative research methods. The population and unit of analysis were Pastoral Caregivers (Deliverance Workers) and a former *sakawa* victim who was once a client at the Patmos Prayer and Retreat Centre, Akropong Akwapem. The purposive sampling technique was used to select the Pastoral Caregivers (Deliverance workers) at the Patmos Prayer and Retreat Centre, especially those directly involved as caregivers for the *sakawa* victims. Since this is a sensitive issue, we used the snowballing sampling method to sample a *sakawa* victim who used to be involved, two caregivers who were also Prayer Directors, and the Founder/Director of the Centre (Sarfo et al., 2021). Also, critical observations and notes were taken during visits to the Centre and how deliverances of clients were performed. Content analysis was used to analyse the data collected from the primary respondents. Interpretation of the data was done in line with the research objectives. Themes were generated based on the frequency of appearance in the data and information obtained from the respondents.

3. Results

The analysis yielded seven themes: the definition of *sakawa*, root causes of *sakawa*, *sakawa* membership acquisition processes, *sakawa* wealth sustenance strategies, consequences of breaching *sakawa* instructions, help-seeking behaviour, and the caregiving at the Patmos Prayer and Retreat Centre.

Definition of Sakawa

The researcher needed to understand what *sakawa* was. According to the respondents, *sakawa* generally involves engagement in occultic practices through the internet for wealth, influence, power, fame and favour. The occultic rituals include activities such as consulting an evil transcendent being (such as dwarfs, dead people, and evil spirits) who can work for the seeker's satisfaction. One of the respondents had this to say, "... From my experience, you engage them, and you realise that for some, it is about soliciting for some special powers to become influential and powerful. This is in a sense that, if you are the managing director of a firm, you get approached by them for a particular position. The moment you see such people, you must fulfil whatever request they bring. So this is not just the case that they always come for money. They can say that most of them seek money, but there are also aspects where they go for powers to become powerful and influential. There are aspects of "sakawa" that you can call "for girls".

Root Causes of Sakawa

From the respondents, the first root cause of involvement in *sakawa* is the insatiable desire or quest for wealth; "it is a quest for supremacy, wealth, riches, favour and fame. Other aspects could be external factors like enticement, allurements, and peer pressure, but we are talking about

the quest for supremacy, riches, and favour, among others". Most of the victims are typically lured in by their peers and friends.

Furthermore, most people got involved in *sakawa* due to unemployment and financial constraints. It is a truism that participants of the *sakawa* subculture are primarily unemployed, low-income young men living in low-income areas. Unemployment is a major undeniable factor which has lured many youth into these fraudulent activities. Most of the youth that indulge in these activities are viable from deprived areas and slums, hence low level of education and skills. Therefore, they resort to it as a means of improving their standard of living. The drive for money can destroy relationships, resulting in immoral decisions and compromise. It can also bring spiritual ruin.

Sakawa Membership Acquisition Processes

Most people are lured into it by their friends; they are usually ignorant about the actual processes involved. In describing the process involved, the former *sakawa* victim said, *"...victims are people who lust for money and often end up in situations where they least expected to be. Victims don't know the type of sacrifices sakawa demands. Unexpectedly, you will be told to sacrifice pigeons and chickens, and later, demands level up to sacrifice sheep, then cattle and finally human sacrifice. Such sacrifices may go an extra mile to demand for your loved ones, which will be hard to offer. Before we became rich, we once had a covenant with an evil spirit, "Maame Water"[Queen of Marine Spirits]. Sometimes, we engage directly with dwarfs where we communicate directly with them; when they talk, it echoes, but our response to them sounds normal. We could be instructed to have a smoking challenge with them whereby the person who smokes more straws of cigarettes than the dwarf wins."*

The former *sakawa* victims also had a few words of advice for young people engaged in *sakawa*, *"these are some things happening in this country currently. I happen to have experienced such an act before, so I am at this moment using this platform to advise the youth and everyone to desist from such acts or anyone associated with such acts because evil forces back there, and there's nothing good that comes from such acts. I'm revealing all these secrets to caution everyone out there. There's no one out there to help you without consequences. Everyone should be vigilant that "Not all that glitters is gold"; there are always consequences. So, everyone should be very careful in their day-to-day activities and wait on the Lord, and there is time for everything and everyone, so no one should engage in acts that will shorten their lives."*

Sakawa Wealth Sustenance Strategies

In order to sustain the wealth they are given through *sakawa*, practitioners are barred from eating certain foods (e.g. mudfish, pork, crab) and doing certain things like not getting closer to a lady in her menstrual period, passing behind somebody taking his/her bath, not having sex with a woman on certain days and not applying soap on the head when bathing. Some victims may even be told not to marry.

The former *sakawa* victim continued to explain the process: *"There was a time we were stripped naked, and we had sex with these dwarfs. The dwarf could even demand bread and Lucozade (energy drink) and some requests for bananas. When the dwarfs realise they can't render any help to you, they tell you to go and return later; thus, if you are unfortunate, you could even be told to bring humans for sacrifice and could be deprived of eating certain foods like mudfish, pork, and crab, and doing certain things like not getting closer to a lady in her period or pass behind somebody taking their bath, not having sex with a woman on certain days, not to apply soap on your head when taking your bath, some may even tell you not to marry and other devastating instructions. And trust me, you there not breach any of these directions. And mind you, I'm not narrating from a hear-say but from a personal encounter with these things. Sakawa people can be identified by looking at their little finger; you realise it is always standing, or some also have rings on their little toes or fingers. Some could even have rotten bodies while alive till they die. Some people extract the blood of others, including children, by giving out money or other gifts to them. These gifts have consequences and spiritual backings; the moment you use or spend them, you fall sick and can die."*

Some people are asked to extract the blood of others, including children, by giving out money or other gifts to them. For a person who is involved in activities such as these they could be classified as demonised. They have gone so far in the way of sin that they and their works are

identified with evil. It is, in other words, a very serious state of sin. Not only does such a person sin like any other sinner but also is sin so prominent in their life that Satan is recognised in them.

Consequences of Breaching Sakawa Instructions

There are dire consequences for breaching such instructions. The former *sakawa* victim said, *"...mental problems, miserable life or even death could be examples of punishments, and these happen when one fouls any of the rules or directions given; many friends of mine died premature deaths along the line. This is because some of the demands requested cannot be met by the victims, like bringing your mother for a sacrifice to the gods or a very close relative. This happens when one is given a knife and pot and is directed to stab inside the pot; whoever picture is stabbed during the process will end up dying, or another alternative is to kill yourself. Most of the time, all these rosaries and talismans hang in people's cars or not just any object, but these are somehow connected to the shrine, and they are used to identify the people in the car by the fetish priest. In this case, if anyone with a strong soul is in the car, there would be any form of accident. Still, suppose all the people in the car have a weak soul. In that case, accidents are likely to happen". This may be unrelated. Still, the case can be established that evil spirits can cause sicknesses and infirmities. Jesus Christ described a woman with the issue of blood for eighteen years as a "daughter of Abraham, whom Satan has kept bound for eighteen long years" (Luke 13: 16, [King James Bible](#)). The expression "crippled by a spirit" or having a spirit of illness is a strong affirmation that evil spirits can be the cause of certain sicknesses and infirmities.*

Help-Seeking Behaviour

Participants of *sakawa* only seek help when they realise they are in danger or when it turns out that they cannot meet certain demands being placed on them. Some also have encounters with God where they hear a voice speaking to them to repent. In describing the event that culminated in his conversion, the former *sakawa* victim said, *"I got delivered from this situation on one Wednesday when my friends gave me a drink that contained "weed". When I drank this drink, it heightened my spirit, and I was on my way to the hospital when a voice spoke to me that this is the time, I have to do the Lord's work. That was when I came to my senses".* This experience can be likened to the experience of the Apostle Paul as he neared Damascus on his journey. A light from heaven flashed around him, and he fell to the ground and heard a voice speaking to him. A man named Ananias was asked to see Paul so that he might receive his and be filled with the Holy Spirit (Acts 9, [King James Bible](#)). There is no question but that Ananias was the agent through whom the Lord restored Saul's sight (Acts 22:16, [King James Bible](#)).

Caregiving at the Patmos Prayer and Retreat Centre The case must be firmly established that the caregivers or deliverance workers at the Patmos Centre were very well grounded in exorcism [the exercise of deliverance over negative spiritual forces and activities]. The deliverance cases of *sakawa* will not differ from the activities they normally carry out at the Centre. At Patmos Centre, *"What we basically do here is we use the word of God and prayer to get people back into the society or to the nod because sometimes there is a deviation from the nod. I normally provide a recommendation by referring them to a psychologist".*

Pastoral caregivers at the centre need to be always prepared for battles. It has been heard in many places that deliverance ministers are attacked spiritually because of their work. The battle to engage evil spirits on a daily basis is somewhat of a difficult thing to do. The caregivers at the Patmos Centre claimed they are always fortified, so they do not have spiritual attacks after delivering. One indicated, *"The Bible has always been my source of refuge. Jesus said; You will know the truth, and the truth shall set you free. They have to understand the knowledge of the word of God, and they will be delivered. It is definite, and that is the word of God. So, the level of deliberation of the word of God will give you knowledge and put you at the top. They know something but are shallow in the word of God, which is why they go to the extent of doing certain things. So by educating them on the knowledge of the word of God and going for the truth."*

Before (Preparation for Deliverance)

It was revealed that there are *sakawa* victims who refuse to go through deliverance in order to be free from its consequences. Because of this, the team at the Patmos Centre prepare their clients before they minister deliverance to them. They hold preparatory prayer meetings. Deliverance ministers basically depend on the Word of God through prayer to prepare themselves to engage in spiritual warfare. Victims have to understand the knowledge of the Word of God and they will be delivered. This time of preparation is expected to put the minister and the one to be

delivered in positions that are favourable for deliverance to take place and to forestall any spiritual consequences. As indicated by one of the respondents; *“We deem them special because of just the name “sakawa” attached. You mention sakawa and it raises an “alarm”. We deem them special because in dealing with it calls for special attention and they approach applied to other cases will not be the same approach. Because “sakawa” is an issue that has a bearing on both the person and spirituality. Also, is special because extra time will be needed to engage the spirit involved”*. Special care is given to *sakawa* victims.

During the process of Deliverance

At the Patmos Centre, there is a vivid procedure on how to conduct deliverance for anyone seeking help. *Sakawa* cases are peculiar from other spiritual cases because of just the name *sakawa* attached. Anytime it is mentioned anywhere, it raises an “alarm”. It is also deemed special because in dealing with it, it calls for special attention, and the approach applied to other cases will not be the same approach applied to this one. This is because *sakawa* is an issue that could have a serious bearing on both the person and his or her spirituality. Also, it is special because extra time will be needed to engage the spirit(s) involved. The emphasis at the Centre is to exhaust those processes, such as taking them through the word of God and praying with them. Basically, it is constant prayer and Bible studies. The Bible is prominent in dealing with *sakawa* cases. In the ministry of Jesus Christ, he confronted demons and evil spirits vigorously and cast them out of people they were possessing and hindering. It appears clearly that He saw this as a vital part of His mission to free the captive people for His Kingdom. The Gospel records are replete with verifications of this ministry.

After (Post Deliverance Activities)

It is necessary to engage in post-deliverance activities for victims of *sakawa*. At the Patmos Centre, *“What we call referral is done. Referral is placed on two notes. The first is when the person has to seek counselling from a professional or a Christian counsellor, and the second is by referring them to churches. Due to the links, we have all over the country. We can direct the person to churches or our partners around them so we can follow up. At times, we organise an orientation by training them. And there are some that we secure vocation for, depending on the person’s ability”*. The deliverance can be sustained through faith in Christ alone.

5. Discussion

We sought to provide theological reflections on pastoral care for *sakawa* victims at the Patmos Prayer and Retreat Center in Ghana. Scholars generally agree with this definition of *sakawa*. For instance, Armstrong (2011) defines *sakawa* as the use of evil occult powers to commit successful internet fraud, possessing the mind of the foreign cyber target. Oduro-Frimpong (2011) also agrees with this assertion that participants of *sakawa* manipulate others by the use of occult religious rituals to obtain fast money through the internet. Generally, there is a strong case of manipulation of victims. The practitioners use evil spirits to get their victims. The victims are hypnotised, so they are usually not aware of what is happening to them. They see things as if they are on the right path. Once they are under the spell, they act in accordance with the instructions of the practitioner. Mainly, they only realise they have been ‘fooled’ after executing the act.

The case under investigation focused on the insatiable quest for ungodly wealth. There are two forms of this practice; one is solely blood ritual (someone has to die before one can acquire their wealth), and the other is when objects, properties or pictures of people are used as bait to scam people falsely. In these two cases, one person wants to be rich at the expense of the other. In reality, the practice of *sakawa* usually goes beyond internet fraud. Also, it involves ‘witchcraft, ‘blood money’ (known as *sika duro* amongst the Akan), *ju-ju* or ‘magic’ and most commonly, a combination of them all. All these, no matter the intention, are embedded with evil manifestations. Once another person is deprived of their wealth in a way they are unaware of, *sakawa* has taken place or is in operation. The idea behind *sakawa* makes it a menace to be dealt with.

Furthermore, Leviticus 19:31, 20:6 warn against all these practices: the consultation of mediums for whatever purposes (King James Bible, 2017). In spiritualism, a medium is a person who conveys spiritual messages or is an intermediary who stands in the gap between the living and spirits to communicate messages seen, felt or heard regarding the past, the present or the future. These mediums might even offer supposed prophecy in their function. Biblically, mediums partake in occult practices, which include necromancy, magic, and fortune-telling, all of which are

abominations to the Lord. People who engage in “divination, soothsaying, augury, sorcery, the use of charms, mediums, wizardry or necromancy” are doing so to gain power over destiny and control people and events to their liking.

It happens that most of them are not told the actual demands that would be made on them by the medium they consult. They only get entangled in it and afterwards realise that they cannot bear it. It is the love for money that the Apostle Paul warns Timothy about 1 Timothy 6:6-10 (King James Bible, 2017). This is because it is a trap with inherent dangers. Satan uses it to control and rule the world and even to destroy many Christians. Jesus Christ taught that the worries of this life and the deceitfulness of riches tend to choke God’s Word and keep people from ever producing fruit in Matthew 13:22 (King James Bible, 2017). The problem with wealth is that one tends to idolise it and put their trust in it. The Bible not only warns against the dangers of loving money but also gives many tragic examples of those who loved it. For instance, Lot’s love for wealth led him to Sodom, where he lost not only his wealth but his family, for his wife turned to a pillar of salt, and his daughters raped him in Genesis 13-14; 19 (King James Bible, 2017). Achan’s love for money brought Israel defeat and his family’s death in Joshua 22:20 (King James Bible, 2017). Judas betrayed Christ for silver (Luke 22), and Demas left Paul because he loved this present world, possibly referring to the wealth of it [2 Tim. 4:10] (King James Bible, 2017). Paul says that the love of money has made some even wander away from the faith [1 Tim. 6:9-10] (King James Bible, 2017).

One cannot love God and money - only one can be the master (King James Bible, 2017). No doubt, it is for this reason that Satan constantly tries to draw people after it through the TV, commercials, social pressure and examples of success in society. One must learn contentment to be free from the love of wealth, as indicated in 1 Timothy 6:6 (King James Bible, 2017). To be free from the love of wealth, one must develop an eternal perspective which considers that we brought nothing into this world, and so one poses things after life on earth has ended (King James Bible, 2017). To be free from the love of wealth, we must recognise the dangers of desiring it, as indicated in 1 Timothy 6:9-10 (King James Bible, 2017).

Today, the entire culture is built upon the accumulation of wealth and material possessions. It is the foundation of free enterprise, the principle behind the system of credit cards and debt, banking and loans. It is what drives the advertising, music, entertainment and sports industries. It is easy to put Christian ministry, personal godliness, acts of justice and charity and sacrificial giving on the peripheries of life to see no connection between these Christian “ideals” and life as one experiences it. The truth is that there is no compatibility. Even so, one is forced to decide which offers truth and illusions, which brings contentment and peace and leads to frustration and emptiness. The Apostle Paul was not against the drive to accomplish or the ambition to make a difference in the world or on the job. The Bible clearly states that one must work hard to be a model employee or employer. But money should not be the driving force. It should be God’s glory that pushes every believer, love of people and the mission of the church (1 Cor. 10:31, King James Bible).

Most people are lured into it by their friends; they are usually ignorant about the actual processes involved. Most of the time, they are told nice things about it. The dangerous sacrifices are hidden from them. However good the description of the activities of *sakawa* may be to a seeker, the reality when later engaged is never good. In Matthew 24:4, Jesus warned against the spirit of deception (King James Bible, 2017). If people could come in the name of Christ to deceive many, Christians must always be alert against deceptive vices, be it from friends, family members, colleagues at work, or even church members. Whether those actions include human sacrifice or merely playing around on the fringes of spiritualism, every inclination to the deed (*sakawa*) is evil. It is an act of rebellion rooted in deception, taking us back to the garden where the devil tempted Eve by saying they would not undoubtedly die (Genesis 3:4, King James Bible).

To gain the wealth promised by the spirits, *sakawa* wealth seekers are made to make many sacrifices. Some sacrifice their body; hence, one will observe that some have their fingers or toes with rings, cut or in some strange positions (always standing erect). Some sacrifice animals such as fowl, lambs or humans. The human sacrifice demands mostly the use of close friends or relatives. The crux of the matter is that money is never for anything but always in exchange for a living human being, preferably a blood relative or spouse. Moreover, there is the possibility of becoming infertile, which means the sacrifice of future offspring. All cases thus deal in principle with human fertility being exchanged for money. The capacity to procreate or its products and its relations have to be sacrificed. All these must be done for a person to acquire the wealth. It is rumoured that

sakawa boys sleep in coffins or do not bathe for weeks; some even kill a small girl and eat her like *fufu* (A Ghanaian dish). They do whatever their leaders tell them, and then they have the *ju-ju* power to do their evil tricks. Then their spirit can enter the internet, possessing the *obroni* (white person) to get their money. The respondents at the Patmos Centre confirmed all these rumours.

There are grave spiritual effects when one is engaged in *sakawa*. Some hear strange voices at night and feel restless. They also have weird dreams. Some cannot eat well, which greatly affects their health. An evil spirit (dwarf) is believed to work on individuals who have encounters with certain spirits. When the spirits work on the individual, the person begins to hallucinate, which results in schizophrenia and bipolar disorders. Scripture affirms these effects: physical symptoms like blindness, deafness and dumbness (Mark 9:17, 25, [King James Bible](#)); foaming at the mouth (Mark 9:18, [King James Bible](#)); convulsions, gnashing of the teeth, falling and rolling on the ground and psychological symptoms such as self-infliction of injury (Mark 5:5, [King James Bible](#)); suicidal tendencies (Mark 9:22, [King James Bible](#)); screaming (Mark 1:22, [King James Bible](#)); tearing off clothes (Mark 1:34). Saul's condition recorded in 1 Samuel 16:14, 18:10, 19:9, [King James Bible](#) probably prompts the issue that when an "evil spirit" enters into a person, it produces certain mental and emotional sicknesses, which may well have been diagnosed today as schizophrenia. In addition, involvement with evil forces makes irresistible desires to commit immoral deeds, use drugs, exploit neighbours for personal benefits and yield to any sinful or destructive impulses. Whether one believes in the devil or not, all these things happen when one identifies himself with evil things and gives them top priority. The suicidal tendencies after engaging in *sakawa* are real. Because of the spiritual torture people go through, they feel like ending their lives so that they will not suffer anymore. A similar case could be that of Judas, who scripture says he was involved in "blood money". On the night of betrayal, it was indicated Satan had entered into Judas (Luke 22:1-8, [King James Bible](#)), put the idea into his heart and used him for his sinister purposes. According to Matthew 27:1-10, after learning that Jesus was to be crucified, Judas attempted to return "the blood money" he had been paid for his betrayal to the chief priests and committed suicide by hanging. Eventually, he hanged himself.

There are prayer Centres and camps littered all over the country. Africans or Ghanaians generally love religion and strongly believe in God and gods. Since people are continuously seeking solutions to their ailing problems, the place of spiritual camps can never be outmoded, especially in Ghana. These Centres have served as places for healing, deliverance, and prophecies. Key mention can be made of the Abasua Mountain, where thousands of people troop yearly for spiritual nourishment ([Asamoah-Gyadu, 2013](#); [Omenyo, 2006](#)). It is, therefore, not out of place to have a Centre like the Patmos Prayer and Retreat Centre specialised in deliverance issues. With over a decade of experience in the deliverance ministry, *sakawa* victims will surely be assisted to receive their breakthrough if they visit the Centre. The personnel at the Centre have the knowledge, skill and spiritual gifts necessary for undertaking such exercises.

At the Patmos Centre, they believe that deliverance has to do with the general idea of setting people free from the bondage of Satan and not just demons. It is the setting free or releasing from spiritual or physical bondage or imprisonment (of a person, place or situation, including setting free from demonic influence). It is the rescuing or being rescued, release from captivity, slavery, oppression, or any restraint, rescue from danger or any evil. They also believe that it is synonymous with terms such as, "Salvation", "Redemption", "Forgiveness", "Liberation" and "Release" (Matthew 26:2, Luke 24:47, Acts 13:18) ([Abboah-Offei, 2021](#)). Other theologians have given their definitions of deliverance. According to Martey (1997), deliverance is "the process of casting out demons to set people, demonised objects and places free from different bondages in the name of Jesus Christ". Also, according to Asamoah-Gyadu (2007), deliverance is liberating someone from the power, influence and bondage of an evil source through prayer in the power of the Holy Spirit. When deliverance is explained as salvation, it is the type of deliverance where God, through an individual, brings deliverance to individuals, the whole community and the nation. It also involves protection and safety (Judges 15:18; 2 Kings 5:1, 13:17; 1 Chronicles 11:14, [King James Bible](#)). In deliverance, one is entitled to salvation, liberation, and recovery. (Heb. 11:35, [King James Bible](#)), involves forgiveness, pardoning people, setting them at liberty and giving remission of sins (Luke 4:18, [King James Bible](#)). Ghanaian independent Pentecostals pay considerable attention to healing and deliverance because they are considered part of the vital visible signs of the outpouring of God's Spirit. Healing and deliverance also fit into the indigenous views of religion as a survival strategy.

The Africans have long practised “deliverance” or exorcism. Our ancestors practised religion as a way to “ward off evil”. This was necessary because when anyone consciously or unconsciously offended the gods, they needed to appease or be cleansed so that evil did not befall them. The use of terms in the local dialect that resonate with the concept of deliverance is another evidence that deliverance was common in Africa, Ghana. Local practices such as *akraguare*, *musukpamo*, *aweréba*, *ahodwira/odwira*, *kunaye*, *kyiribra*, *twa asuo*, *sasaduro/sesapam* born out of the Ghanaian idea of deliverance are well documented. They mostly involve the ritual cleansing of an individual who has gone through some form of trauma and committed mischief and evil so that their soul is restored. This view is reflected in such Ghanaian sayings as “*se rotwe adze fi sor na omba a, nna biribi dze mu*”, a theme of a popular song by Ghanaian highlife musician A.B Crentsil. The literal meaning of this Akan saying is that “if efforts towards an endeavour continually prove elusive, it probably means that the venture is being hampered by forces beyond one’s control.” Concerning the present discussion, healing and deliverance provide the ritual context for articulating a response to the inevitable shortfalls existing in the ‘redemptive uplift’ expected to accompany new life in Christ (Abboah-Offei, 2021).

The following Biblical passages also enforce the African idea of deliverance as an escape, to slip out, carry away to safety for refugee safety (Genesis 45:7; 2 Chronicles 12:7; Psa. 32:7; Joel 2:23; Obad. 1:17. It also involves the ceremonial cleansing from guilt, sanctification, and consecration. In Esther 4:14 (King James Bible), deliverance means to snatch away, pluck or recover. It also stands for saving someone from a situation or taking someone out of danger. This type of deliverance is a life-and-death affair. Widowhood rites performed to separate a living and dead spouse also fall into the category of deliverance. The removal of pain, the banishment of criminals to prevent evil from befalling a town or society or rituals performed for someone who is haunted by a ghost or spirit resonate with the Christian idea of deliverance (Abboah-Offei, 2021).

The African charismatic conceives deliverance in terms of freedom from sin, from one’s spiritual enemies (that is, the devil, evil spirits, witchcraft, and other such inimical forces) whose main duty is to ‘steal, kill and destroy’ the children of God (John 10:10). Proponents of healing and deliverance believe firmly in the causal relationship between sin, the work of demons and ill-health. This understanding partly explains why charismatic churches believe in and practice healing and deliverance as pastoral care for the flock of God. Regarding this demand, some churches run courses for their pastors to alert them of the need to integrate healing and deliverance into their pastoral responsibilities (Omenyo, 2006). A lot of Charismatic and Pentecostal Churches organise such training for their Pastors. This is rare in Historic Mission Churches such as The Methodist Church of Ghana, The Presbyterian Church of Ghana, and the Anglican Church.

The interactions with the team at the Patmos Centre revealed that some Pastors or Reverend Ministers refuse to engage in deliverance for people they know are into *sakawa*. Reasons attached to this case include the disbelief or ignorance in the deliverance ministry. Some are afraid of Satan and demons, and others do not have the gifts for it or are not committed to doing it. They indicated that although it is expected of every Pastor to be able to engage in deliverance for their congregants, not every Pastor can administer deliverance to their congregants. They believe there are people especially gifted in deliverance and exorcism for dealing with spiritual issues, including *sakawa*.

In the same way, God primarily used Ananias to help Apostle Paul after His encounter on the road to Damascus; the caregivers and deliverance workers at the Patmos Prayer and Retreat Centre are gifted and anointed to handle deliverance cases related to *sakawa*. The practice of healing and deliverance in African or Ghanaian settings also involves consultation with gifted experts to determine the cause of spiritual attacks and exercise spiritual authority. This could be the reason for setting up numerous prayer Centres in the country. This is because most people believe their needs can only be met when they meet a ‘powerful’ Pastor. They also believe that successful deliverance or healing processes depend on the practitioner’s ‘level of anointing’. The more anointed and gifted the practitioner, the more effective their practice of healing and deliverance on the victim or seeker. This form of pastoral care attracts more people to the practitioner’s churches. This is probably why not everyone can handle cases such as *sakawa*.

One of the characteristic features of prayer and retreat camps is that it is centred on one dominant person who is seen as the Prophet or Healer. Notable mention can be of Apostle Mintah of Okantah (Suhum), Prophetess Grace Adu of Edumfa (Cape Coast), Apostle Owusu Tabiri and Prophet Sampson Adum of Suhum. There has not been any significant change in this trend. Recent

Charismatic appeal to large numbers of seekers is the fact of their dominant gifts as ‘powerful’ preachers. They believe that it always takes a special man of God to diagnose a spiritual problem and follow it up with binding and casting out of the demon or evil spirit. This situation places a special role and demands on the deliverance ministers. They become special people of God with special God-given abilities to ‘deliver’ people from their problems (Omenyo, 2006). Just as it happens at the Patmos Centre, many of the healing and deliverance leaders have trained special teams of assistants who play various supplementary roles such as analysis of questionnaires, counselling, restraining of violent people and others. These are all done under the instructions and directions of the dominant deliverance minister. Deliverance is designed to eliminate the spiritual obstacles that impede progress. Deliverance makes the rough places smooth and the crooked places straight (Abboah-Offei, 2021).

It was revealed through the interview that, those who need deliverance are; those coming out of cults, witches and wizards, those who are sick (physically or spiritually), those who wet their bed even though they are old, oversleeping, insomnia, those under curses, those with evil covenants, mental cases which defy medical treatment, those who have suicidal tendencies, those who have the urge to murder, those with poor business growth, the oppressed, addicts, whoremongers and those who have had psychic experiences, those with compulsive behavior patterns, those with escapism problems, violent tendencies, those who hallucinate (visual and auditory), extreme unacceptable behaviors, those with serious disappointments in all endeavors, those with demonic incisions, those who experience absolute poverty, gluttons / those who cannot control their eating habits, those who hate the gospel / Christ, outlaws, stingy people, the rejected, self-opinionated and people who do not understand anything.

Deliverance leaves no room for compromises, hence, a self-preserving ingredient for the Church. Deliverance radicalises the challenge of pluralism and the damage of syncretism by stressing the traditional Christian attitude of seeing demons in other religions (Kwami, 1998). In like manner, the deliverance minister has to avail him or herself to the blood of Jesus Christ – the perfect and final sacrifice so that their conscience is cleansed and they or become sensitive to the prompting of the Holy Spirit. As the living Word of God begins to awaken the heart and cleanse the conscience, one is drawn by God’s love to serve Him faithfully again. The Word of God awakens and illuminates, and the blood of Jesus thoroughly cleanses (Ahinful, 2015). Deliverance is not something that can be formulated. Simply following a routine of saying this and doing that will not bring true deliverance. Jesus is the ultimate deliverer (Ahinful, 2015; Kwami, 1998).

As part of the preparatory processes for deliverance, Asamoah-Gyadu (2005) explains that candidates are prepared through confession of sin by the candidate and the renunciation and breaking of all covenants. The first goal is to help the victim understand that they do not need to go through the process to receive deliverance. Jesus is true to His Word, and anyone who seeks Him in the right spirit with the right “tools” will experience His freeing power. One tool we teach is a series of action steps for getting free: repent, renounce and break. This preparation also involves repentance. Repent means being “re-penitent” or “again humble.” One who is penitent expresses humble or regretful pain or sorrow for sins or offences. To repent means returning to that place of humility and sorrow over sin. If there is no genuine repentance, they continue to walk in darkness, deceived by the enemy. And if they continue to be deceived, they remain in bondage. They also need to renounce (give up, refuse, or resign by formal declaration). Whereas repenting is directed toward God, renouncing is directed toward the enemy. In this process, they renounce any words that contradict God’s Word and no longer align themselves with things that oppose God (Ahinful, 2015; Kwami, 1998).

At the Patmos Centre, it can be observed that some of these deliverance sessions could be quite physical, with clients speaking under the influence of some demon and rushing around in the open space, sometimes pursued by a team of men and women who physically restrain the victims. In some instances, as the prayer goes on, the minister and his team members move among the people and lay hands on them. The ‘blood of Jesus’ and ‘the name of Jesus’ are repeatedly invoked to rebuke the spirits responsible for the various problems. The reactions include sobbing, groaning, shouting, roaring, falling and struggling on the ground. Although scripture does not specifically outline a procedure for confronting and expelling evil spirits from the lives of those so infected, notice can be made of several actions taken by those who confronted them in Biblical times. The common components in all references seem to be verbal commands to the evil spirit directly to

relinquish and leave the body of the victims (Matthew 8:16). In some circumstances, a touch by Jesus in the ears and on the tongue was necessary (Mark 9:25, 35; Matthew 17:18). Authority directly from Christ and a valid faith in Christ are essential in order for a disciple to be able to cast the evil spirits out (Matthew 10:1; Mark 9:19, 29; Matthew 17:20, 21; 15:28).

Faith healing is practised at the Patmos Centre. They believe that God is the ultimate source of healing, and there is no need to consult Him through any medium but to present their case to Him directly in church. God has a lot of ways to heal us based on the redemptive work of Christ. It is something Jesus paid for and something He suffered for. His wish for you to be healed and walk in divine health is why He endured so much pain and suffering. Therefore, He has made healing available to you through many avenues. At the Patmos Centre, this kind of healing or deliverance is done through the laying on of hands (Luke 4:40). *Sakawa* victims are plagued with generational demons of infirmity, such as diabetes, high blood pressure, certain heart conditions, and more. Asamoah-Gyadu (2007) confirms the Biblical examples and asserts that deliverance involves a person, often a deliverance minister, praying effectively for the victim by laying on their hands and speaking a word of command, sometimes applying anointing oil or water, thereby casting out the evil spirit, and inviting the Holy Spirit to take over the victim's life after they have accepted and committed themselves to Christ. This process also involves the burning of all emblems and materials associated with non-Christian religion.

6. Conclusions and Recommendations

The Patmos Prayer and Retreat Centre has great credibility when it comes to the handling of *sakawa* victims. *Sakawa* generally involves the engagement in occultic practices for wealth, influence, power, fame and favour. The occultic practices include consulting an evil transcendent being (such as dwarfs, dead people, or evil spirits) who can work for the satisfaction of the seeker. The root cause of involvement in *Sakawa* is the insatiable desire or quest for wealth. Most of the victims are normally lured in by their peers and friends. As a result of unemployment, financial constraints are also a major cause of involvement in *sakawa*. There are lots of sacrifices for anyone who wants to engage in *sakawa*. The sacrifices include sacrificing one's body (fingers, toes, organs and other body parts), animals (fowls, lambs or humans), prohibition against the eating of certain foods (mudfish, pork, crab), restriction from certain relationships (no marriage, no sexual relations, restriction from activities on certain days, restriction from women in menstruating periods) and giving with ulterior motives. The spiritual effects of engaging in *sakawa* include the following: hallucinations, sleepless nights, weird dreams, ill-health, self-infliction of injury, drug abuse, sexual immorality, and suicidal tendencies. The consequences for breaching *sakawa* instructions include madness, a miserable life, and premature death.

Participants of *sakawa* only seek help when they realise they are in danger or when it turns out that they cannot meet certain demands being placed on them. At the Patmos Centre, *sakawa* victims are taken through certain spiritual processes to bring deliverance to their body, soul and spirit. They also have pre and post-counselling sessions focusing mostly on prayer and Biblical teachings. Deliverance workers are bound to suffer some forms of spiritual attacks due to their involvement with *sakawa* victims. However, if they fortify themselves with the whole armour of God, they are free from any attacks from the evil one. Post-deliverance counselling for victims of *sakawa* is the only way their faith in Christ can be sustained. Post counselling activities include referrals to other specialists to seek medical, psychological, vocational and financial assistance.

The Church must find a very appropriate means of positively helping young people use the internet and other modern technology. This can be through guided use by young people in the church's café or through proper education to be vigilant. Constant teaching must be done by Reverend Ministers of Churches to engage young people on the dangers of engaging in occultic practices and its repercussions on their wellbeing. The Church must take a keen interest in *sakawa*-related issues. This is because there are lots of Christian youth engaged in it. The Church needs to be informed correctly regarding the spiritual dimensions of this evil and not let the secular groups have the definitive answers. Christ really is the answer to combat this deluge. Most Christian counsellors who have 'stumbled' *sakawa* cases testify to having received very little if any, training in their respective seminaries or churches regarding it. This deficiency must be remedied. Theological Seminaries and Bible Schools must also show keen interest in developing a theology of wealth creation and a manual to teach its Ministers and members how to handle deliverance cases

related to *sakawa*. Psychiatrists, school counsellors, police agencies, and abuse Centres must heighten awareness levels in the country. Security agencies must be empowered to deal with participants and adherents.

6. Declarations

Ethics approval and consent to participate

Approval given by the Trinity Theological Seminary, Legon-Accra, Ghana and Patmos Prayer and Retreat Centre, Ghana.

Consent for publication

Not applicable.

Availability of data and materials

Available upon request.

Conflict of interest statement

The authors report no conflicts of interest.

Funding

Not applicable.

Acknowledgements

I thank the support of the Patmos Prayer and Retreat Centre, Ghana, Trinity Theological Seminary, Legon-Accra, Ghana, and all participants.

Authors' ORCID

Enoch Kwame Tham-Agyekum  <https://orcid.org/0000-0003-1657-1409>

References

- [Abboah-Offei, 2021](#) – *Abboah-Offei, E.A.* (2021). Deliverance procedures, Patmos Prayer and Retreat Centre (Unpublished document), Akropong, Ghana.
- [Ahinful, 2015](#) – *Ahinful, K.* (2015). What is the next step after deliverance? [Electronic resource]. URL: <https://newsghana.com.gh/what-is-the-next-step-after-deliverance/> (date of access: 09.08.2021).
- [Armstrong, 2011](#) – *Armstrong, A.* (2011). “Sakawa” rumours: occult internet fraud and Ghanaian identity. Unpublished BSc. Working Report in Anthropology, London: University College.
- [Armstrong, 2011](#) – *Armstrong, A.* (2011). Sakawa’ rumours: occult internet fraud and Ghanaian identity. Department of Anthropology, University College, London. Working paper.
- [Asamoah-Gyadu, 2005](#) – *Asamoah-Gyadu, J. K.* (2005). African Charismatics–Developments within Independent Indigenous Pentecostalism in Ghana. African Christian Press, Koninklijke Brill NV, Leiden.
- [Asamoah-Gyadu, 2007](#) – *Asamoah-Gyadu, J.K.* (2007). ‘Born of Water and the Spirit’: Pentecostal/Charismatic Christianity in Africa” In O.U. Kalu, *African Christianity: An African Story*. Trenton, NJ and Asmara, Eritrea: Africa World Press Inc.
- [Asamoah-Gyadu, 2013](#) – *Asamoah-Gyadu, J.K.* (2013). Contemporary Pentecostal Christianity: interpreting from an African Context. Oxford: Regnum Books International.
- [Black, Hawk, 2010](#) – *Black, P., Hawk, R.K.* (2010). Computer and Internet crimes. San Francisco, California
- [Boateng et al., 2011](#) – *Boateng, R., Olumide, L., Isabalija, R.S., Budu, J.* (2011). Sakawa-cybercrime and criminality in Ghana. *Journal of Information Technology Impact*. 11(2): 85-100.
- [Danquah, Longe, 2011](#) – *Danquah, P., Longe, O.B.* (2011). Cyber deception and theft: An ethnographic study on cyber criminality from a Ghanaian perspective. *Journal of Information Technology Impact*. 11(3): 169-182.
- [Duah, Kwabena, 2015](#) – *Duah, F.A., Kwabena, A.M.* (2015). The impact of cybercrime on the development of electronic business in Ghana. *European Journal of Business and Social Sciences*. 4(1): 22-34.
- [King James Bible, 2017](#) – *King James Bible.* (2017). King James Bible Online. [Electronic resource]. URL: <https://www.kingjamesbibleonline.org/> (Original work published 1769).
- [Kwami, 1998](#) – *Kwami, S.Y.* (1998). Deliverance (A scriptural Approach). Sonlife Printing Press.

[Martey, 1997](#) – *Martey, E.* (1997). The importance of fasting for the deliverance ministry. *Trinity Journal of Church and Theology*. 7(1&2).

[Mohammed et al., 2013](#) – *Mohammed, A.A., Yusuf, A.B., Saidi, A.* (2019). Computer Human Interaction: A Blessing or Curse for Ghanaian Youth? *International Journal of Academic Research in Business and Social Sciences*. 9(3): 884-901.

[Oduro-Frimpong, 2011](#) – *Oduro-Frimpong, J.* (2011). Sakawa: on occultic rituals and cyber fraud in Ghanaian popular cinema. [Electronic resource]. URL: http://www.media-anthropology.net/file/frimpong_rituals_cyberfraud.pdf (date of access: 05.03.2020).

[Oduro-Frimpong, 2014](#) – *Oduro-Frimpong, J.* (2014). Sakawa rituals and cyberfraud in Ghanaian popular video movies. *African Studies Review*. 57(2): 131-147.

[Omenyo, 2006](#) – *Omenyo, C.N.* (2006). Pentecost outside Pentecostalism: A Study of the Development of Charismatic Renewal in the Mainline Churches in Ghana. Zoetermeer: Boekencentrum Publishing House.

[Onyina, 2012](#) – *Onyina, O.* (2012). Pentecostal Exorcism: Witchcraft and Demonology in Ghana. Dorset: Deo Publications, 2012.

[Sarfo et al., 2021](#) – *Sarfo, J.O., Debrah, T., Gbordzoe, N.I., Afful, W.T., Obeng, P.* (2021). Qualitative research designs, sample size and saturation: Is enough always enough? *Journal of Advocacy, Research and Education*. 8(3): 60-65.

[Sinrod, Reilly, 2000](#) – *Sinrod, J.E., Reilly, P.W.* (2000). Cybercrimes: a practical approach to the application of federal computer crime laws. *Santa Clara University School of Law Journal*. 16(1): 117-232.

[Wall, 2010](#) – *Wall, D.S.* (2010). Criminalising cyberspace: the rise of the internet as a “crime problem”, in Y. Jewkes, M. Yar (Eds.). *Handbook of Internet Crime* (p. 88–103). London, Willan Publishing.





Publisher: Centre for Behaviour and Wellness
Advocacy, Ghana
Co-publisher: Cherkas Global University, USA
Has been issued since 2014
ISSN 2410-4981. E-ISSN 2508-1055
2023. 10(2): 93-104

DOI: 10.13187/jare.2023.2.93

Journal homepage:
<http://kadint.net/our-journal.html>



Secondary School Learners' Online Learning Experiences During COVID-19 Lockdown

Munyaradzi Chirove ^{a, *}, Ijeoma C. Ogbonnaya ^b

^a University of Pretoria, Pretoria, South Africa

^b University of the Free State, Qwaqwa, South Africa

Abstract

This study investigated secondary school learners' experiences and perceptions of online learning during COVID-19. A convenient sample of 69 learners participated in the study. The data was collected with the aid of a questionnaire. Thematic analysis was applied to open-ended responses. Descriptive statistics and frequencies were calculated on both closed- and open responses with the aid of SPSS software. The paper exploits the Community of Inquiry framework on classifying learners' online learning experiences. It was discovered that learners had both positive and negative experiences in the social, cognitive, and teaching dimensions of online learning. They experienced greater online learning challenges in the social dimension than in other dimensions. The teaching dimension contributed most to learners' enjoyment of online learning, while the least enjoyment was contributed by social presence. They approached online learning with varied perceptions that could be classified into negative, positive, and very positive perceptions. Moreover, their perceptions of online learning could be classified as positive.

Keywords: COVID-19, online experiences, perception, online learning, secondary school learners.

1. Introduction

COVID-19 is an acute respiratory illness in human beings that is caused by the coronavirus (World Health Organization, WHO, 2020). The disease has the potential to produce severe and devastating symptoms, and in some people, it may cause death (WHO, 2020). The outbreak of COVID-19 in China in December 2019 (WHO, 2020) and its fast worldwide spread in early 2020 endangered the livelihood of all nations. South Africa is one of the countries strongly hit by the coronavirus pandemic and declared a state of emergency in March 2020 (Chirinda et al., 2021). It introduced the nationwide lockdown in late March 2020 as one way to mitigate the coronavirus's spread and flatten its exponential growth curve.

The closure of schools and universities resulted in a sudden and probably unplanned pedagogical paradigm shift in the education system. Teachers must shift from traditional face-to-face to online teaching methodologies (Ganesh Kumarau et al., 2021). Online learning is internet-based learning that is synchronous (e.g., Zoom, Microsoft Teams) and/or asynchronous (e.g., E-mail, Forums, WhatsApp) (Sridevi, 2021). Online teaching and learning emerged with its pros and cons. Most schools were caught unprepared for the new 'norm'. To rescue the school

* Corresponding author

E-mail address: chirovem25@gmail.com (M. Chirove)

academic year, they had to abruptly implement online teaching and learning methods without proper training of teachers, learners and parents' education on the necessity of online learning (Panaoura, 2020). Most schools had inadequate technological software and hardware. Most teachers and learners were learners of online teaching and learning systems (Saboowala, Mishra, 2021). They must learn new digital teaching and learning ways, seek solutions to emerging challenges, and acquire knowledge from the worldwide community (Chirinda et al., 2021).

Several lessons might be learnt from both teachers' and learners' experiences of teaching and learning in the COVID-19 lockdown era. The rich experiences might inform and possibly resolve some pedagogical and learning issues in the education system (Darragh, Franke, 2021; Means, Neisler, 2021). Reflections and evaluation of the COVID-19 teaching and learning practices could be valuable in designing, developing, and implementing both the teacher and learner development courses. Moreover, based on the findings of this study, institutions might improve the quality of and tailor online learning to meet the needs and expectations of learners in respective socio-economic conditions (Cranfield et al., 2021; Harefa et al., 2022). Bast (2021) views a learner's perceptions of online learning as the primary determinant of motivation and persistence in and dropout from learning. In contrast, Armstrong (2011) views them as determinants of a learner's approach to online learning. Hence, this study investigated secondary school learners' online learning experiences during COVID-19 in South African schools.

The study aims to answer the research questions:

- What are the secondary school learners' online learning experiences during the time of the COVID-19 lockdown in South Africa?
- How do secondary school learners perceive online learning during the COVID-19 lockdown?

2. Literature Review

Countries reacted differently to the closure of schools during the COVID-19 pandemic. It was observed that some countries adjusted their curriculum to cater for the lost days. Some countries trained the teachers and offered some necessary assistance and support to keep abreast of the new change. However, in some countries, schools and teachers reacted indifferently to the closure of schools. They neither adopted remote learning strategies nor trained the teachers and learners to equip them for the new change despite the complete or partial closure of schools for almost a year (Munoz Najjar et al., 2021). Batmang et al. (2021) and Kamsurya (2020) cite uncertainty of educators' image as online instructors, high workload, inadequate or lack of technical support, and lack of training to effectively use technology in teaching, and incompetence as some possible causes of resistance to adoption of online teaching and learning by some teachers. Some schools that abruptly resorted to online discovered themselves in an online learning paradox (Cranfield et al., 2021; Almahasees et al., 2021). That is, they chose an online learning approach without proper preparation. For example, they offered online learning lessons, although most learners did not have devices and data to access the internet (Ikram, Rosidah, 2020; Marban et al., 2021; Ogbonnaya et al., 2020). This resulted in an uneven take-up of instruction, thus amplifying inequalities among the 'haves' and 'have not' (Munoz Najjar et al., 2021).

Some teachers and learners adopted various teaching and learning online platforms such as WhatsApp, Zoom, WebEx, and YouTube. Though Delima and Chyawatti (2021) assumed that the current generation would easily adapt to online learning because of its conversance with technology, Naidoo (2020) observed that semi-urban learners faced difficulties in using digital platforms during the COVID-19 lockdown. This could be due to inadequate learner preparation for online learning. In South African rural township schools, the WhatsApp platform was discovered to be an invaluable tool in the teaching and learning of high school courses (Chirinda et al., 2021). Similar findings were reported by Agung et al. (2020). The learners in their study considered WhatsApp as a friendly internet data application. They preferred WhatsApp to other e-learning platforms because it uses less data, works well in a poor internet signal, and is familiar with its use. A resort to the WhatsApp platform could be due to financial constraints. Thus, there was limited access to advanced technological online platforms.

Learners approached online learning with mixed feelings and perceptions (Delima, Cahyawatti, 2021; Means, Neisler, 2021). For instance, some learners perceived online lessons as more flexible, convenient, and compatible with other everyday life activities, for example, work

(Khan et al., 2021; Muthuprasad, Girish, 2021). According to Khan et al. (2021), learners had positive perceptions of e-learning because of the perceived benefits of freedom to connect with their teachers and classmates and engage with study materials in the comfort and flexibility of space and time. Some of them viewed online lessons as less effective for learning as compared to face-to-face lessons (Harefa et al., 2022). Negative perceptions of online learning could compromise their level of engagement and learning outcomes (Bast, 2021). Most of the learners' negative experiences of online learning were, notably, caused by delayed teacher feedback, unavailability of technical support from teachers, lack of self-regulation and self-motivation, the feeling of isolated, monotonous teaching approaches, and poorly designed teaching and learning material (Putra et al., 2021). Because of the lack of direct contact with peers and the teacher and lack of immediate feedback from the teacher, most of the learners were observed to feel lost, frustrated, and isolated.

Teachers were not trained to design learning activities appropriate for online learning. As such, some of the learning materials they used could not promote independent learning among learners. Learners found it challenging to understand it, possibly because of lack of clarity, not systematic, and the language used was not easy to understand (Asrowiah et al., 2021; Elango et al., 2008). Elango et al. (2008) observed learners' dissatisfaction with the graphics and animations included in the course materials and the effectiveness of content delivery methods (Means, Neisler, 2021). Teacher incompetence resulted in the underutilisation of online learning platforms and failure to utilise them to promote active learner participation optimally.

3. Conceptual Framework

For effective online learning, the instruction should take cognisance of the importance of teacher-learner, learner-content, and learner-learner interactions (Bektashi, 2018; Bernard et al., 2009; Garrison et al., 2000; Garrison, 2009; Jaggars, Xu, 2016). Jaggars and Xu (2016) contend that the level of learner-teacher and learner-learner interaction in an online lesson might predict learning outcomes. On this note, Bernard et al. (2009) discovered that teaching and learning instructions with a higher level of teacher-learner, learner-content, and learner-learner interactions produced better learning outcomes.

Garrison et al. (2000) developed a Community of Inquiry (COI) model for an effective online learning experience. The COI framework highlights social, teaching, and cognitive presence as essential elements to facilitate effective online teaching and learning experiences. Social presence is the ability of the participants to develop interpersonal relationships and to communicate in an environment of mutual trust (Garrison et al., 2000). Cognitive presence involves the construction and confirmation of knowledge through dialogue and reflection on learning experiences. The teaching presence is the teaching and learning content and climate the teacher develops to realise optimal learning outcomes (Flock, 2020). The skilful use of the three presences in the design of productive online learning environments facilitates meaningful knowledge construction (Bektashi, 2018; Flock, 2020). Flock (2020) arguably considers the COI framework as a concrete asset for designing online environments that could resolve the currently experienced online learning issues.

Thus, this study utilises the COI conceptual framework of Garrison et al. (2000) to categorise and analyse the learners' online experiences. It categorises the learners' online experiences into three dimensions: social, cognitive, and teaching. Moreso, it hypothesises that if these dimensions were utilised optimally, learners' perceptions of online learning would be 'very positive'. Some challenges faced in online learning could mirror poor and ineffective marshalling of the three dimensions into the e-learning environments.

4. Methods

Research design

This study used a descriptive research design to determine secondary school learners' online learning experiences and perceptions during the COVID-19 lockdown.

Population

The study was conducted in a city secondary school in the Western Cape province of South Africa.

Sampling and sample size

A purposive selection of the school that offered online learning lessons to grades 10 to 12 during the lockdown was done. A convenient sample of 69 learners who consented to participate in the study was selected. They were composed of 22 grade 10, 29 grade 11, and 18 grade 12 learners. During the COVID-19 lockdown, they attended online Mathematics, Mathematical literacy, business studies, Life sciences, physical sciences, Accounting, and English lessons.

Research instruments

Data was collected using a questionnaire. The questionnaire was divided into three sections. The first section collected demographic data of the learners, for example, grade, gender, and subjects learnt online. The second section was composed of 24 Likert scale items that elicited the learners' perceptions of online learning. Learners had to rate each statement from strongly disagree to strongly agree. The last section was an open-ended questionnaire that was made up of 10 questions. It required learners to justify or explain why they preferred some forms of online learning, the challenges they experienced learning online, and suggestions on how to improve online learning. As such, the first and second sections of the questionnaire elicited the learners' experiences of online learning.

The Likert scale items had a Cronbach's reliability coefficient $\alpha = 0.94$, which was highly acceptable. The learners' responses to the two open-ended questionnaires were cross-validated to highlight any converging and diverging views on online learning. As such, a learner's consistency in response to the questions was used as a measure of the reliability of the open-ended questionnaires.

Data presentation and analysis

The data was presented in tables, extracts of learners' responses, and descriptions of the findings. The Likert scale items were analysed using SPSS, and the variables favouring online learning, for example, 'I enjoy online learning', were coded from 1 = strongly disagree to 4 = strongly agree. The variables that did not favour online learning, for example, 'I hate learning online', were coded from 1 = strongly agree to 4 = strongly disagree. Each learner's and all learners' average online learning perception scores were calculated. Their perceptions were determined using the criteria in Table 1. The frequency of learners in each classification of perceptions was computed and analysed. Their average scores on each item were used to identify the examples of variables that reflected the learners' perceptions.

Table 1. Criteria for classifying learners' perceptions

Classification	Average perception score (\bar{x})
Very negative	$0 < \bar{x} \leq 1$
Negative	$1 < \bar{x} \leq 2$
Positive	$2 < \bar{x} \leq 3$
Very positive	$3 < \bar{x} \leq 4$

The data from open-ended questions were analysed using thematic analysis. The paper analysed each learner's response to every question, noting the keywords on every relevant statement. The keywords served as the codes used to develop the main themes. The themes were used as a category for all learner responses that had the same meaning. The categories of learners' experiences in online learning were further classified and analysed using Garrison et al.'s (2000) Community of Inquiry framework. Learners' experiences were classified into cognitive, teaching, and social dimensions. Proportions of learners whose experiences fall into each dimension were calculated and analysed. This assisted in data reduction.

5. Results

Firstly, their perceptions of online learning were presented. These responses were mainly tapped by the closed-form questionnaires. Descriptive statistics and frequencies were presented in tables. Then, learners' online learning experiences were categorised into cognitive, social, and teaching dimensions. They were tapped by the open-ended questionnaire and inferred from the responses to the closed-form questionnaires. Extracts of their responses to the open-ended questions were presented as empirical evidence of the findings.

Learners' perceptions of online learning

An analysis of the average perceptions score shows that the learners had 'very positive perceptions of the variables: 'I am willing to actively communicate with my class classmates online ($\bar{x} = 3.06, \sigma = 0.62$)'; 'I am willing to actively communicate with my teachers online ($\bar{x} = 3.03, \sigma = 0.62$)', 'I could easily complete my online assignments on time ($\bar{x} = 3.15, \sigma = 0.73$)', 'I have enough computer skills for doing online learning ($\bar{x} = 3.13, \sigma = 0.69$)'; and 'I feel that face-to-face contact with my teachers is necessary to learn ($\bar{x} = 3.25, \sigma = 0.81$)'. Most of them (85.5 %, 87.4 %, 82.6 % and 86,9 %, respectively) strongly agreed and agreed with the variables. They had positive perceptions of the variables: 'I could easily access the internet as needed for my studies ($\bar{x} = 2.99, \sigma = 0.86$)', 'I could manage my online learning time effectively ($\bar{x} = 2.82, \sigma = 0.73$)', 'I feel comfortable communicating online ($\bar{x} = 2.81, \sigma = 0.74$)', 'I receive a quick response during online learning activities ($\bar{x} = 2.84, \sigma = 0.68$)', and 'I can work with other students during online learning activities ($\bar{x} = 2.83, \sigma = 0.69$)'. The learners who strongly agreed and agreed with these variables were 73.9 %, 71.0 %, 68.1 %, 66.6 %, and 72.4 % of them, respectively. Negative perceptions were on the variables, 'I believe that learning online is more motivating than face-to-face learning ($\bar{x} = 2.00, \sigma = 0.90$)', and 'Online learning is as good as face-to-face class learning ($\bar{x} = 2.10, \sigma = 0.93$)'. A few of them (21.7 % and 30.4 %, respectively) strongly agreed and agreed with these variables (see [Table 2](#)).

Table 2. Learners' perception of their online learning experience (n = 69)

Items	Frequency					Mean	Std. Dev.
	SA	A	D	SD	N		
I could easily access the internet as needed for my courses	20	31	13	4	1	2.99	0.86
I am comfortable communicating online	8	38	18	4	1	2.74	0.75
I am willing to actively communicate with my classmates online	14	45	8	1	1	3.06	0.62
I am willing to actively communicate with my teachers online	12	49	6	2	0	3.03	0.62
I find it easy to set aside time for learning online	13	28	22	5	1	2.72	0.86
I could manage my online learning time effectively	10	39	16	3	1	2.82	0.73
I hate learning online	17	11	37	3	1	2.38	0.91
I could easily complete my online assignments on time	21	36	7	2	3	3.15	0.73
I enjoy online learning	11	24	25	7	2	2.58	0.89
I enjoy working with other students in online groups	9	35	18	4	3	2.74	0.77
I have enough computer skills for doing online learning	19	41	6	2	1	3.13	0.69
I feel comfortable communicating online	10	37	17	3	2	2.81	0.74
I feel comfortable to ask my teachers questions during online learning activities	12	35	18	3	1	2.82	0.77
I receive a quick response during online learning activities	11	35	22	0	1	2.84	0.68
I feel that face-to-face contact with my teachers is necessary to learn	0	16	20	33	0	3.25	0.81
I can discuss with other students during online learning activities	6	44	13	5	1	2.75	0.72
I can work with other students	9	41	17	2	0	2.83	0.69

Items	Frequency					Mean	Std. Dev.
	SA	A	D	SD	N		
during online learning activities							
Online learning is as good as face-to-face class learning	6	15	27	20	1	2.10	0.93
I believe that learning online is more motivating than face-to-face learning	6	9	32	21	1	2.00	0.90
I believe a complete course can be taught online without any difficulty	8	27	24	7	3	2.55	0.84
I can pass a course online without any face-to-face class lecture	9	28	18	11	3	2.53	0.93
I found it difficult to adjust to the online learning context	18	22	24	2	3	2.15	0.86
Online learning encouraged the exchange of ideas	7	36	15	5	6	2.71	0.77
Online learning enhanced my learning	4	28	23	10	4	2.40	0.83
I enjoy learning online	8	28	18	11	4	2.51	0.92
SA= Strongly agree; A= Agree; D= Disagree; SD= Strongly disagree; N= non-response							

They could be grouped into three categories based on their perceptions of online learning. The proportions of them with negative, positive, and very positive perceptions of online learning were 13.0 %, 66.7 %, and 20.3 %, respectively. Thus, 87 % of them had positive and very positive perceptions of online learning. Their average perception score was 2.63, with a standard deviation of 0.54. Consequently, they could all be classified as having positive perceptions of online learning.

The cognitive dimension of learners' online learning experiences

A few learners (18.8 %) rated their digital literacy as poor and limited. Most (82.2 %) declared adequate, good, very good, and excellent digital literacy. Many of them (76.8 %) used a laptop computer for online learning. The smartphone only or a smartphone and laptop/desktop computer were used for online learning by 15.9 % of the learners. Only 7.2 % of them stated using only a desktop computer for online learning. They enjoyed online learning because of receiving less cognitively demanding tasks (26.7 %) and 'accessing many different online resources (11.1 %) (see Table 3). The cognitive presence contributed to 37.8 % of learners' enjoyment of online learning. Some examples of learners' responses are:

"My teacher explained things well and tackled any confusion that had arisen in online learning."

"I focus better, and I'm able to understand the work much better than I would do in a class. I have more access to more resources as well."

"Active examples were carried out. One can view an experiment and its results without carrying out the physical experiment."

Table 3. Explain why you enjoyed learning the subject or subjects online

Variables	Frequency	Percent
Less demanding tasks are given	12	17.4
Well explained concepts	9	13.0
Engaging activities	12	17.4
Access to many different online resources	5	7.2
Quick feedback	4	5.8
Not enjoyable	3	4.3
No response	24	34.8
Total	69	100.0

They faced challenges in understanding concepts (33.3 %). This is evident in the following examples of learners' responses: *"Some concepts were difficult to understand especially in*

Mathematics, Physical sciences, and life sciences” and *“Explanation of physics and mathematics work...It required a great deal of thinking and understanding”*. Their positive experiences of online learning with the highest frequency were ‘engaging lessons and tasks’ (11.1%), and ‘understanding concepts better 15.6 %’. Below are some extracts of their responses:

“It is easier to work at my own pace, and I understand the work better when doing extra research.”

“I was able to go back to videos or topics discussed in groups and enhance my understanding.”

The teaching dimension of learners’ online learning experiences

Most of them (92.3 %) spent at most 6 hours per day on online lessons. WhatsApp, Zoom and YouTube were the common online platforms used for online learning. Many of them (81.3 %) found WhatsApp as the most valuable online learning platform. A few learners (15.6 %) declared using Zoom only or Zoom and WhatsApp to be the most valuable for online learning. Most of them (70.8 %) preferred a combination of video, audio and typing presentations to one form of online learning. Their reasons for enjoying learning certain subjects were ‘well-explained concepts’ (20 %), and ‘engaging activities (26.7 %’). In total, the ‘teaching presences’ contributed to 46.7 % of the learners’ enjoyment of online learning. Below are some of their responses:

“I have such a motivated teacher, and even through these crazy times, he continued with his dedication and constantly reminded us that we will get through this...”

“The teacher made it fun and enjoyable.”

“It’s more adventurous.”

Some challenges they faced in learning online were ‘unsuitable learning environment (8.9 %)’ and ‘too much workload (8.9 %)’. Only 6.7 % of them did not enjoy learning any subject online (see [Table 3](#)) due to, for example, delayed feedback, noisy learning environment, and poor-quality pictures or audio.

The social dimension of learners’ online learning experiences

They enjoyed online learning because of receiving quick feedback (8.9 %). The presence of teacher-learner interactions in lessons is evident in the following responses:

“I could easily ask questions because my teachers were always responsive.”

“It was easy to understand and manageable, activities were explained to us, and clear instructions were given.”

Most of their challenges in online learning were social. Fewer opportunities were created for learner-learner interactions in the form of group work or working on a project. They could hardly share ideas or assist each other in problem-solving. This is evident in the following response: *“I don’t always understand and can’t see how and what to do to seek help from other learners”*. Some of them (37.9 %) could not join the online lessons on time because of lack of data (38.5 %), competing personal or household programs (34.6 %), poor or loss of connectivity (23.1 %), and other reasons, e.g., health issues (3.8 %).

Most of them (91.9 %) encountered disturbances or challenges from their respective homes during online lessons. The disturbances or challenges encountered could be classified as ‘noisy environment (51.4 %), ‘loss of connectivity (8.1 %), and ‘competing personal and household programs’ (32.4 %). Some additional challenges they faced in learning online were ‘unsuitable learning environment (8.9 %), ‘delayed feedback or assistance not readily available (15.6 %), and ‘too much workload (8.9 %). Some of their responses were:

“Chores or somebody needing help. Television is a major disturbance as well. I also frequently check my cell phone.”

“I didn’t always have data and had to, sometimes, skip my classes until I was able to get some sort of internet connection.”

Amid the online learning challenges learners faced, they had some positive experiences. The social presence contributed to 20 % of the learners’ online learning positive experiences. Their positive online learning experiences could be classified as ‘quick on-spot feedback (2.2 %)’ and ‘free self-expression without stage fright (17.8 %). The learners posted some suggestions to curb some

of the online learning challenges and improve the quality and effectiveness of online learning. Their suggestions could be categorised as ‘provide learners with devices and data (28.9 %)', ‘use more interactive online platforms, e.g., Zoom (23.7 %)', ‘blend visuals and text lessons (5.3 %)', ‘suitable online learning pace; give more explanations (18.4 %)', ‘reduce learner workload; give important notes (21.1 %)', and ‘improve home online learning environment (2.6 %)'.

6. Discussion

WhatsApp was discovered to be the most valuable online learning platform in the secondary school in this study. This finding agrees with Chirinda et al. (2021) and Agung et al. (2020), who discovered the WhatsApp platform as a valuable tool that could support the teaching and learning of courses outside the classroom in economically challenged communities. A relatively large number of learners could not log in or join lessons on time. Most of them failed to do so due to not having data and some competing personal and household programs. The school might have overlooked this factor of data or internet connectivity as one of the determinants of success in online learning. The lack of data might have affected their consistency in online learning. This finding resonates with those several studies discovered that in some low- and middle-income countries, although the governments provided schools with online learning solutions, most of the learners could not access them due to a lack of devices and connectivity constraints (Almahasees et al., 2021; Ikram and Rosidah, 2020; Munoz Najar et al., 2021; Munoz Najar et al., 2021). Some learners could not access the learning content because of the use of mobile phones, which were not compatible with e-learning platforms (Agung et al., 2020). Almahasees et al. (2021) discovered that some learners could not afford to always buy the data. Similarly, Ikram and Rosidah (2020) posit that they could not participate fully in online learning mainly because of limited internet connectivity. Moreover, Batmang et al. (2021) discovered that the learners’ success and enjoyment in online learning were, to some extent, connected to data packages.

Failure to log in on time or disturbances in online learning due to some competing personal and household programs could be a result of a lack of proper online orientation and training for both learners and parents. Parents should be taken on board in online learning to play their expected roles to make it a success. Parental involvement in online learning, e.g., creating a conducive learning environment and monitoring learner online engagement, is vital. Panoura’s (2020) findings applaud parents’ training on online learning issues to get them well informed about it. An unsuitable online learning environment was the most common disturbance encountered by learners at home. Most of them complained of the noise from their homes or neighbours. Some lacked proper facilities to conduct online learning. This disturbance is more likely in low- and medium-income homes or communities. This finding aligns with the results of studies like Munoz Najar et al. (2021), Bast (2021), and Cranfield et al. (2021) findings that the take-up of online is dependent upon the educational and economic level of the parents or families or communities. The poorer families, communities, or countries were observed lagging far behind the richer ones in the scale and scope of their online learning.

Not understanding concepts taught online was one of the major challenges they encountered. This could have been coupled with limited bidirectional teacher-learner interaction in lessons. Learners could not ask questions and receive immediate feedback in some online learning platforms like WhatsApp. Some online learning materials are not suitable for self-access. A similar challenge was discovered by Asrowiah et al. (2021) and Elango et al. (2008). Learners in their study encountered difficulties in understanding the online learning materials.

The major factors contributing to their enjoyment of online learning were receiving less cognitively demanding tasks, well-explained concepts, and engaging activities. Though they enjoyed receiving less cognitively challenging tasks, the expectation is a delivery of a balanced curriculum at cognitive levels. This could jeopardise their engagement and success in online learning if not well managed. The online tasks should be of appropriate cognitive levels as stipulated in the curriculum guidelines and able to engage all learners of different learning styles. On this issue, Kamsurya (2020) discovered that teachers faced challenges in designing the appropriate teaching and learning materials for online learning.

A high proportion of them enjoying satisfactory explanations of concepts and a low proportion of them enjoying quick feedback in learning might, somehow, reflect the dominant kind of interaction that transpired in the lessons. The unidirectional way of communication (teacher to learner) seems to

dominate other forms of interaction. In conjunction with delivering well-explained content, the teacher should assess and verify both the intended and the constructed knowledge in learners. This facilitates on-spot correction of misconceptions and timely feedback. Thus, the active interaction of all participants in a lesson cannot be overlooked (Ganesh Kumarau et al., 2021). Kamsurya (2020) discovered that teachers and learners used online platforms that could not interactively facilitate learning activities. Moreover, Almahasees et al. (2021) point to learners' lack of the influence of peer learning, probably because of a lack of direct contact and interaction among them. Sadly, they viewed online learning as a barrier to their engagement in real class activities.

Although a small proportion of them had poor or limited digital literacy, a small proportion enjoyed accessing many different online resources. This can be attributed to data and connectivity constraints. Exploration of different online resources might largely depend on the availability of data, knowledge of the available online teaching and learning resources, and level of digital literacy. Marban et al. (2021) discovered that learners' limited digital literacy adversely affects their effective online take-up. Most of them battled with online learning platforms. It was sad to note that they could not take advantage of the technological networking platforms for learning.

A higher proportion of them expressed some positive experience of online learning in the teaching dimension. They had memorable, engaging lessons and tasks, access to recorded lessons or videos anytime, fast work coverage, and could do their school anytime-anywhere. Muthuprasad and Girish (2021) discovered that learners in their study preferred recorded classes and questions at the end as a form of assessment. From the social dimension of online learning, a smaller proportion of them could express themselves freely without stage fright, unlike in face-to-face learning. The teaching presence contributed most to learners' enjoyment of online learning. This was followed by cognitive presence. More social presences need to be added to online learning to stimulate learner interest and enjoyment in learning.

Despite having positive perceptions of the social dimension, most of their challenges and dissatisfaction were on inadequate social presence in online learning, especially in class discussions and lack of or delayed feedback. This agrees with the findings of Almahasees et al. (2021). They observed that opportunities for learner-learner interactions were rarely availed to them. They had positive perceptions of the cognitive dimension of online learning. For example, positive perceptions were discovered concerning accessing the internet, exchanging ideas online, enhancing learning, and completing a course online. There was a need to promote more learner-content interactions for effective knowledge construction.

They had mixed perceptions of the teaching dimension of online learning. Positive perceptions were centred on the effectiveness of online learning in bringing joy, easy communication, quick feedback, corroboration, and satisfaction in learning. On the other hand, they doubted its effectiveness compared to face-to-face learning. Similarly, Ikram and Rosidah (2020) observed that learners in their study became less motivated, less active, and less productive when their courses turned to online instruction, probably because they preferred face-to-face to online learning. This finding contradicts Ogbonnaya et al. (2020), who found that Ghanaian learners' motivation to learn increased when their courses were turned to online learning. Overall, they were discovered to have positive perceptions of online learning. These perceptions could be partially regarded as products of their past online learning experiences and social peer interactions. Arguably, they are constantly evolving due to exposure to new experiences. For rich online learning experiences, an effective blend of the cognitive, social, and teaching presences in the online learning environment should be aimed for (Fiock, 2020; Garrison, 2009). This could optimise the learning outcomes and modify learners' perception of e-learning.

7. Conclusion

The experiences of learners in online learning could be classified into social, cognitive, and teaching dimensions. They had both positive and negative experiences in each dimension. Under the cognitive dimension, they had challenges with data, connectivity, and understanding concepts. They enjoyed working on engaging activities and exploration of various online learning resources. In the social dimension, they enjoyed the freedom of speech (free self-expression). They could freely express themselves in online lessons. Most of their dissatisfaction was with the inadequate social presence in the online lessons. They queried the available opportunities for learner-learner interactions, as the teacher-learner interaction dominated the lessons and delayed or lacked immediate feedback.

In the teaching dimension, they enjoyed good explanations from the teachers, though they perceived it to be inadequate and inconsistently provided in lessons. Some negatives were difficulties in understanding the learning materials and high learner workload with sometimes no explanations. The WhatsApp platform dominated other platforms of e-learning. This platform was in favour of learner-content interaction at the expense of other forms of interaction. Learners received more work sets than explanations. The problem was worsened by a lack of immediate teacher feedback on the challenges encountered in learning and un conducive home learning environments.

Their perceptions of online learning could be classified into negative, positive, and very positive perceptions. They had both negative and positive perceptions of the teaching dimension of online learning. Some positives were well-explained concepts and enhanced understanding of concepts. Teachers could explain some concepts clearly with the aid of technology. An example of teaching presence found inadequate was the ability to bring motivation and satisfaction to learning. Some learners preferred face-to-face to online learning. They had positive perceptions of the cognitive dimension of online learning. Their positive perceptions were on issues relating to accessing the internet, exchanging ideas online, understanding concepts, and completing the course through online learning. Very positive perceptions were on the social dimension of online learning. Seemingly, they approached online learning with high expectations of engaging in different learning interactions. It was disappointing to note that their interactions were probably limited due to circumstances or factors beyond their control, such as data and connectivity or the online learning platform.

Overall, the perceptions of learners on online learning were positive. Based on this finding, it can be concluded that they approached online learning as directed by their positive perceptions. The positive perceptions could enhance or be a barrier to effective learning if the teaching, cognitive and social presences are not skilfully mixed in the online learning lessons.

8. Limitations

This paper presents an analytical description of learners' online perceptions under the Community of Inquiry framework. It utilises the strengths of both quantitative and qualitative research techniques in quantifying and describing their online teaching and learning perceptions. However, the data analysis did not consider the possible interactions among the independent variables, the teaching, cognitive, and social presences. A more integrated analytical data analysis approach, such as structural equation modelling or multiple regression analysis, could have explored the relationships between the constructs. This paper studied one city school. As such, the results obtained might only apply to this school.

9. Implications for research and intervention

In light of these findings, this paper recommends (a) the adoption of more interactive online learning platforms; (b) teacher development workshops on effective implementation of the Community Of Inquiry framework in the design and delivery of lessons; (c) teacher development workshops on the production of teaching and learning materials that are suitable for online learning; and (d) teacher and learner support on the provision of devices, data, high-speed internet, and conducive teaching and learning environments.

Declarations

Ethics approval and consent to participate

Informed consent was obtained from the participants to conduct the study.

Consent for publication

Not applicable.

Availability of data and materials

Please contact the author for data and materials associated with this study.

Conflict of interest statement

The authors of the manuscript declare that there is no conflict of interest, and all reference materials were duly acknowledged.


Funding


The study was not funded.

Acknowledgements

We sincerely appreciate and thank the school and learners who participated in this study.

Authors' ORCID

Munyaradzi Chirove  <https://orcid.org/0000-0002-0975-5026>

Ijeoma C. Ogbonnaya  <https://orcid.org/0000-0002-9308-1625>

References

- Agung et al., 2020 – Agung, A.S.N., Surtikanti, M.W., Quinones, C.A. (2020). Students' perception of online learning during COVID-19 pandemic: A case study on the English students of STKIP Pamane Talino. *SOSHUM: Jurnal Sosial Dan Humaniora*. 10(2): 225-235.
- Almahasees, 2021 – Almahasees, Z., Mohsen, K., Amin, M.O. (2021, May). Faculty's and students' perceptions of online learning during COVID-19. In *Frontiers in Education* (Vol. 6, p. 638470). Frontiers Media SA.
- Armstrong, 2011 – Armstrong, D. (2011, October). Students' perceptions of online learning and instructional tools: A qualitative study of undergraduate students use of online tools. In *E-learn: world conference on E-learning in corporate, government, healthcare, and higher education* (pp. 1034-1039). Association for the Advancement of Computing in Education (AACE).
- Asrowiah et al., 2021 – Asrowiah, O., Sujadi, I., Slamet, I. (2021, November). Needs Analysis of Mathematics Modules as Learning Materials in Distance Learning During Covid-19 Pandemic. In *International Conference of Mathematics and Mathematics Education (I-CMME 2021)* (pp. 217-223). Atlantis Press.
- Bast, 2021 – Bast, F. (2021, August). Perception of online learning among students from India set against the pandemic. In *Frontiers in Education* (Vol. 6, p. 705013). Frontiers Media SA. DOI: 10.3389/educ.2021.705013
- Batmang et al., 2021 – Batmang, B., Sultan, M., Azis, A., Gunawan, F. (2021). Perceptions of Pre-Service Teachers on Online Learning during the COVID-19 Pandemic. *International Journal of Education in Mathematics, Science and Technology*. 9(3): 449-461. DOI: 10.46328/ijemst.1595
- Bektashi, 2018 – Bektashi, L. (2018). Community of inquiry framework in online learning: Use of technology. In R. Power (Ed.). *Technology and the curriculum: Summer 2018*. Pressbooks. [Electronic resource]. URL: <https://techandcurriculum.pressbooks.com/chapter/coi-and-online-learning/>
- Bernard et al., 2009 – Bernard, R.M., Abrami, P.C., Borokhovski, E., Wade, A., Tamim, R., Surkes, M.A., Bethel, E.C. (2009). A meta-analysis of three interaction treatments in distance education. *Review of Educational Research*. 79(3): 1243-1289. DOI: 10.3102/0034654309333844v1
- Chirinda et al., 2021 – Chirinda, B., Ndlovu, M., Spangenberg, E. (2021). Teaching mathematics during the COVID-19 lockdown in a context of historical disadvantage. *Education Sciences*. 11: 177. DOI: 10.3390/educsci11040177
- Cranfield et al., 2021 – Cranfield, D.J., Tick, A., Venter, I.M., Blignaut, R.J., Renaud, K. (2021). Higher education students' perceptions of online learning during COVID-19: A comparative study. *Education Sciences*. (11): 403. DOI: 10.3390/educsci11080403
- Cranfield, 2021 – Darragh, L., Franke, N. (2021). Lessons from lockdown: Parent perspectives on home-learning mathematics during COVID-19 lockdown. *International Journal of Science and Mathematics Education*. 20: 1521-1542. DOI: 10.1007/s10763-021-10222-N
- Delima, Cahyawatti, 2021 – Delima, N., Cahyawatti, D. (2021). Students' mathematics self-concept, mathematics anxiety and mathematics self-regulated learning during the COVID-19 pandemic. *Jurnal Pendidikan Matematika*. 15(2): 103-114. DOI: 10.22342/jpm.15.2.13200.103-114
- Elango et al., 2008 – Elango, R., Gudep, V.K., Sevam, M. (2008). Quality of e-learning: An analysis based on e-learners' perception of e-learning. *The Electronic Journal of E-learning*. 6(1): 31-34.
- Fiock, 2020 – Fiock, H. (2020). Designing a community of inquiry in online courses. *The International Review of Research in Open and Distributed Learning*. 21(1): 135-153. DOI: 10.19173/irrodl.v20i5.3985
- Ganesh Kumarau et al., 2021 – Ganesh Kumarau, S., Rajefwari, P., Balamuruga, C.R. (2021). Teaching and learning process: A transformation during COVID-19. In S. B. Pasuluri, C. Daniel, D. S. Vijayan, S. Arvandan, & S. Pradeep Kumar (Eds.). *Innovative teaching and learning process during COVID-19* (2nd ed.). Tamil Nadu: IOR International press. DOI: 10.34256/iorip203

Garrison, 2009 – Garrison, D.R. (2009). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks*. 11(1): 61-72.

Garrison et al., 2000 – Garrison, D.R., Anderson, T., Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*. 2(2): 87-105.

Harefa et al., 2022 – Harefa, S., Lamudur, G., Sihombing, A. (2022). Students' perception of online learning amidst the COVID-19 pandemic: A study of junior, senior high school and college students in a remote area. *F100Research*. 14(10): 867. DOI: 10.12688/f1000research.52152.2.

Ikram, Rosidah, 2020 – Ikram, F.Z., Rosidah, R. (2020). Rural vs urban: Teachers' obstacles and strategies in mathematics learning during COVID-19 pandemic. *Southeast Asian Mathematics Education Journal*. 10(2): 69-74.

Jaggars, Xu, 2016 – Jaggars, S.S., Xu, D. (2016). How do online course design features influence student performance? *Computers and Education*. 9: 270-284.

Kamsurya, 2020 – Kamsurya, R. (2020). Learning evaluation of mathematics during the pandemic period COVID-19 in Jakarta. *International Journal of pedagogical development and lifelong learning*. 1(2): ep2008. DOI: 10.30935/ijpdll/8439

Khan et al., 2021 – Khan, M.A., Vivek Nabi, M.K., Khojah, M., Tahir, M. (2021). Students' perception towards e-learning during COVID-19 pandemic in India: An empirical study. *Sustainability*. 13: 57. DOI: 10.3390/su130/0057

Marban et al., 2021 – Marban, J. M., Radwan, E., Radwan, A., Radwan, W. (2021). Primary and secondary students' usage of digital platforms for mathematics learning during the COVID-19 outbreak: The case of the Gaza Strip. *Mathematics*. 9: 110. DOI: 10.3390/math9020110

Means, Neisler, 2021 – Means, B., Neisler, J. (2021). Teaching and learning in the time of COVID-19: The student perspective. *Online learning*. 25(1): 8-27. DOI: 10.24059/01j.v25i1.2496

Munoz Najjar et al., 2021 – Munoz Najjar, A., Gilberto, A., Hasan, A., Cobo, C., Azevedo, J.P., Akmal, M. (2021). Remote learning during COVID-19: Lessons from today, principles for tomorrow. Washington, DC: World Bank.

Muthuprasad, Girish, 2021 – Muthuprasad, T., Girish, K.J. (2021). Students' perception and preference for online education in India during COVID-19 pandemic. *Social sciences and humanities*. 3(1): 100101. DOI: 10.1016/j.ssaho.2020.100101

Naidoo, 2020 – Naidoo, J. (2020). Postgraduate mathematics education students' experiences of using digital platforms for learning within the COVID-19 pandemic era. *Pythagoras*. 41(1): a568. DOI: 10.4102/pythagoras.v41i1.568

Ogbonnaya et al., 2020 – Ogbonnaya, U.I., Awoniyi, F.C., Matabane, M.E. (2020). Move to online learning during COVID-19 lockdown: Pre-service teachers' experiences in Ghana. *International Journal of Learning, Teaching and Educational Research*. 19(10): 286-303. DOI: 10.26803/ijlter.19.10.16

Panaoura, 2020 – Panaoura, R. (2020). Parental involvement in children's mathematics learning before and during the period of the COVID-19. *Social Education Research*. 2(1): 65-74. DOI: 10.37256/ser.212021547

Putra et al., 2021 – Putra, I.G., Santosa, M.H., Pratiwi, N.P. (2021). Students' perceptions on online peer feedback practice in EFL writing. *Indonesian Journal of English Education*. 8(2): 213-231. DOI: 10.15408/ijee.v8i2.21488

Saboowala, Mishra, 2021 – Saboowala, R., Mishra, P.M. (2021). Blended learning: The new normal teaching-learning pedagogy post COVID-19 pandemic. *Resume Square*. 1-13. DOI: 10.21203/rs.3.rs-410211/v1

Smart, Cappel, 2006 – Smart, K.L., Cappel, J.J. (2006). Students' perceptions of online learning: A comparative study. *Journal of Information Technology Education*. 5(1): 201-219.

Sridevi, 2021 – Sridevi, V. (2021). Recent teaching techniques during COVID-19 – An overview. In B.S. Pasuluri, C. Daniel, D.S. Vijayan, S. Arvindan, S. Pradeep Kumar (Eds.), *Innovative teaching and learning process during COVID-19* (2nd ed.). Tamil Nadu: IOR International press. DOI: 10.34256/iorip203

World Health Organization, 2023 – World Health Organization. Coronavirus disease (COVID-19), 2023. [Electronic resource]. URL: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>