

VIRTUAL LEARNING IN TERTIARY INSTITUTIONS DURING COVID-19 PANDEMIC IN NIGERIA: CHALLENGES AND PROSPECTS

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Abstract

As COVID-19 is still ravaging nations of the world, destroying lives and hindering economic activities of nations including Nigeria and the resultant lockdown, citizens were told to stay in door or avoid public gatherings and crowded places in order to break the chain of transmission of the pandemic. Educational institutions are fully part and parcel of the society hence the COVID-19 pandemic and its consequent lockdown effect also affected the schools, as it had no alternative than to explore other mode of teaching and learning outside the tradition face-to-face lectures mode of teaching. During the lockdown the schools were directed to embrace e-learning for engaging students in learning from their respective homes or otherwise. However the directive is not effective because of some challenges ranging from limited accessibility and network connection, inadequate electric power supply, network and internet connectivity problems, finance, lack of conducive environments for learning and other resources. This opinion article highlights the importance of virtual learning in a time of global pandemic and natural disaster. It also examines the challenges and prospects of virtual learning. The paper used secondary source and personal observation to generate the required data. Based on the findings of this study, recommendations were made and some of the recommendations include that Infrastructural facilities should be given adequate priority and funding, training of lecturers and student on the technical skills required for virtual learning should be given maximum attention.

Keywords: Virtual Learning, Tertiary Institutions, COVID-19 Pandemic.

Introduction

The emergence of internet technology has brought profound growth in the e-learning culture of tertiary institutions in many countries. Unfortunately, most Nigerian schools are yet to fully embrace and implement this. Electronic learning can be defined as an alternate learning process that is done over the internet; no physical classroom, students, or lecturers. It allows for online communication between teachers and learners. Haghshenas, (2019) defined e-learning as the management of learning materials via electronic means such as satellite, CD-ROM, etc The importance of this alternate learning system in Nigeria cannot be over-emphasized, especially in the face of this COVID-19 pandemic. E-learning outfits make it easier for teachers, institutions, and students to strategize, provide, and monitor the knowledge and instruction method (Almaiah, Al-Khasawneh, & Althunibat, 2020). It can also be inferred from Docebo that e-learning has

the possibility to produce positive advancement over the years in Africa (Docebo, 2014). Virtual learning has proven to defy all long-distance/location barriers in the learning process: There will be no need for students to leave their respective homes. Modern learning technologies mean schools no longer need to have expensive infrastructures, students crowding the lecture rooms, etc. as witnessed in the traditional face-face learning method (Mamattah, 2016).

The coronavirus disease 2019 (COVID-19) pandemic in Nigeria is part of the worldwide pandemic caused by severe acute respiratory syndrome coronavirus 2 (SAR COV-2) (Jones, & Blankenship, 2017). Coronaviruses are common in certain species of animals, such as cattle camels and bats which can be transmitted to humans. Some health experts believe that the new strain of coronavirus likely originated in bats or pangolins (Azevedo, Hasan, Goldemberg, Iqbal, & Geven, 2020). The first transmission to humans was in Wuhan, China (Bozkurt, & Sharma, 2020). Since then, the virus has mostly spread through person-to-person contact. The most common way that this virus spreads is through close contact with already infected person. When people with COVID-19 breathe out or cough, they expel tiny droplets that contain the virus. These droplets can enter the mouth or nose of someone without the virus, causing the spread of infection to occur (Olcott, 2020). The disease is most contagious when a person's symptoms are at their peak though, it is possible for someone without symptoms to spread the virus (Esposito, and Principi, 2020). Droplets containing the virus can also land on nearby surfaces or objects and when other people touch such surfaces or pick up the objects and then touches their nose, eyes, or mouth the virus spreads (Olcott, 2020).

The first case of COVID-19 was reported in Nigeria by the Federal Ministry of Health on 27th February, 2020. This was the case of an Italian citizen who works in Nigeria and returned from Milan, Italy to Lagos, Nigeria on the 25th of February, 2020 Daniel, (2020). Since then, the number of confirmed cases of infection keep rising both in Nigeria and across the globe. Nigeria placed a travel ban on 13 countries with high cases of the virus, the countries are; United States, United Kingdom, South Korea, Switzerland, Germany, France, Italy, China, Spain, Netherland, Norway, Japan and Iran. On 11th March 2020, World Health Organization (WHO) declares COVID-19 a pandemic. A pandemic is a disease that has spread across a large region; for instance, multiple continents or worldwide (Bozkurt, and Sharma, 2020).

Over the years, humanity had fought various global health scourges which threatened to wipe human beings off the face of the earth. It is worthy to know that coronavirus is different when compare with the plagues and epidemics that have ravaged humanity throughout its existence, in the sense that none has greatly affected the education of everyone in the world like COVID-19 (Viner, Russell, Croker, Packer, Ward, Stansfield, Mytton, Bonell, and Booy, 2020). Few of these plagues are: The black death (1346-1353) that traveled from Asia to Europe, living devastation in its wake. Also, the Spanish flu (1918-1920) is among the worst pandemic in history, despite the common name of the pandemic, scientists are not entirely sure where the virus originated, though they do know it was caused by an H1N1 virus (similar to swine flu) that originated in birds (Kalyanasundaram, and Madhavi, 2019).

In addition, the Asian flu (1957-1958) was another global pandemic that originated from China, the disease claimed more than 1 million lives worldwide. The Centre for Disease Control and Prevention (CDC) claimed that the disease spread rapidly and was reported in Singapore in February 1957, Hong Kong in April 1957, and the coastal cities of the United States in the summer of 1957 (Ajadi, Salawu, and Adeoye, 2018). Furthermore, the West African Ebola epidemic (2013-2016) ravaged the West African countries with over 28,600 reported cases and 11,325 deaths. The first case to be reported was in Guinea in December 2013, then the disease quickly spread to Liberia and Sierra Leone (Ngampornchai, and Adams, 2016). However, all these plagues and pandemics mentioned above have ravaged the globe thereby interrupting the educational processes in several ways, sometimes, it leads to closure of schools which caused serious drawbacks for learners and deprives them of their right to education and postures them to future risk (Rapanta, Botturi, Goodyear, Guàrdia, and Koole, 2020).

As part of measures to contain the spread of COVID-19 in Nigeria, the Federal Ministry of Education, through the Permanent Secretary in the Ministry, on March 19th ordered the immediate closure of tertiary institutions, secondary and primary schools across the nation over the outbreak of the disease in the country. In addition to this, restriction was placed on inter-states movement, market places were locked, religious gatherings of more than 10 persons were banned, social activities such as parties, ceremonies and club meetings etc. were placed on hold (Kalyanasundaram, and Madhavi, 2019). All public and private schools have to shut the doors of their schools following the government directive. The pandemic has unmasked substantial inequities in the education sector. While some private schools in urban areas are engaging their students through online teaching, a large number of students who are less privileged or are in rural areas were left out (Kalyanasundaram, and Madhavi, 2019). Most schools

lack facilities which hindered them to partake successfully in online teaching like they do in the developed countries (Rapanta, Botturi, Goodyear, Guàrdia, and Koole, 2020).

Virtual learning has become imperative in promoting and sustaining educational development globally considering the disruptive effect of the COVID-19 pandemic on traditional learning. However, the closure of schools has once again highlighted the huge divide between the educational systems in developed economies compared to developing economies like Nigeria. Thus, this work is set to examine the challenges and prospects of virtual learning in tertiary institutions during the covid-19 era in Anambra State. This work also examines the strengths as well as challenges of virtual education which serves as a substitute to face-to-face method of teaching and learning in tertiary institutions in Nigeria.

Concept of Virtual Learning

Virtual learning is the process of using online classroom environments to disseminate information. Virtual teaching and learning processes involve some digital technologies that permit teachers and students not to necessarily be present in the same room. It is the only mode of teaching that can be of help in passing instructions to students in a time like this that social distancing is of utmost important (Miks and Mcilwaine 2020; Agbele and Oyelade 2020). Before the current COVID-19 crisis, digital technologies have also allowed people to move much of their lives such as health, education, social and economic life online (Cojocariu, 2014). Mostly, virtual teaching, open teaching, web-based teaching, computer-mediated teaching, blended teaching etc. have in common the ability to use a computer/mobile phone connected to a network or radio/television set that offers the possibility to teach from anywhere, at any time, in any rhythm, and by any means (Singh and Thurman, 2019). In such a leaning environment, students can be at home or somewhere else and still enjoy the lesson (McBrien, Cheng, and Jones, 2009).

Virtual teaching and learning environment can be in two forms namely: the synchronous learning environment and (Almaiah, Al-Khasawneh, and Althunibat, 2020) the asynchronous learning environment. The synchronous learning environment is structured in a way that students attend live lectures, there are real-time interactions between educators and learners, and there is a possibility of instant feedback. Synchronous learning can provide a lot of opportunities for social interaction (Littlefield, 2018). On the other hand, asynchronous learning environments are not properly structured as learning content and is not available in the form of live lectures or classes; it is available at different learning systems and forums. Also, instant feedback and immediate response are not possible under such an environment (Ayebi-Arthur, 2017).

Virtual learning has played a vital role in the past as it has helped some institutions to overcome the barrier of educational continuity in the time of global crisis (Cojocariu, 2014). For instance, it was online teaching that University of Camerino resorted to when earthquake destroyed almost all their infrastructure and face-to-face interactions were not possible (Singh and Thurman, 2019). Virtual learning also helped University of Canterbury to operate when it was faced with a great earthquake in 2011 (Ayebi-Arthur, 2017). Recently, this disaster is in the form of Covid-19 which has made all schools, colleges, and universities to shut down so as to curb further spread of the virus. Many academic institutions, proprietors, State and Federal Governments are, therefore, seeking the help of online education so that teaching and learning processes are not further hampered. For instance, some state governments such as Lagos, Abia, Enugu, Ondo, Akwa Ibom, Nasarawa, Imo as well as Ekiti States in Nigeria proffered online-virtual education as the possible way out (Agbele and Oyelade 2020).

In general, a complete virtual learning program requires an elaborate lesson plan design, teaching materials such as audio and video contents, as well as technological support teams.

In addition, some schools, especially private schools make use of some online applications to engage their students while the school doors were physically closed. There are several of such online tools available which are important for an effective and efficient learning environment. Educators can use a combination of audio, videos, and text which is embedded in virtual learning to reach out to their students in order to maintain a human touch to their lectures (Jones, & Blankenship, 2017). This also help in creating a collaborative and interactive learning environment where students can give their immediate feedback, ask queries, and learn interestingly.

Theoretical Framework.

Online Collaborative Learning (OCL) by Linda Harasim (2012)

Online collaborative learning (OCL) is a theory proposed by Linda Harasim that focuses on the facilities of the internet to provide learning environments that foster collaboration and knowledge building. Harasim describes OCL as a new theory of learning that focuses on collaborative learning, knowledge building, and internet use as a means to reshape formal, non-formal, and informal education for the Knowledge Age” (Harasim, 2012).

Harasim sees the benefits of moving teaching and learning to the internet and large-scale networked education. In some respects, Harasim utilizes Alberto Barabasi’s position on the power of networks. In OCL, there exist three phases of knowledge construction through discourse in a group:

1. Idea generating: the brainstorming phase, where divergent thoughts are gathered
2. Idea organizing: the phase where ideas are compared, analyzed, and categorized through discussion and argument.
3. Intellectual convergence: the phase where intellectual synthesis and consensus occurs, including agreeing to disagree, usually through an assignment, essay, or other joint piece of work (Harasim, 2012, p. 82).

OCL also derives from social constructivism, since students are encouraged to collaboratively solve problems through discourse and where the teacher plays the role of facilitator as well as learning community member. This is a major aspect of OCL but also of other constructivist theories where the teacher is not necessarily separate and apart but rather, an active facilitator of, knowledge building. This theory is related to this work based on the fact virtual learning is an aspect of e-learning and online learning and it will guide in examining the challenges and prospects of virtual learning in tertiary institutions during the covid-19 era in Anambra State.

Challenges Facing Virtual Learning in Tertiary Institutions

The following are some of the key challenges that have been identified as regarding virtual learning in tertiary institutions in Nigeria:

1. **Limited accessibility and network connection:** Several research studies indicates that lack of access to resources, including home access, is another complex challenge that prevent teachers from integrating new technologies such as virtual learning technology into education. Unavailability of proper digital tools, internet connections or Wi-Fi connections can cause a lot of setback of which many students might lose out from the learning process.
2. **Lack of technical know-how on the part of the teachers and students:** Technical difficulties has been among the major challenge of virtual learning in Anambra state and Nigeria at large as it tends to hinder or slow-down the teaching–learning process. Teachers in the form of facilitators face a lot of troubles while working or preparing for online virtual lesson because some of them lack adequate technical training (Agbele, and Oyelade, 2020). Students may also face some challenges in assessing the online lessons as most of them are not technically oriented.
3. **Time consuming:** A lot of time is involved in online teaching. A considerable amount of investment is needed for getting the devices and equipment, maintaining the equipment, training the human resources, and developing the online content for virtual presentation.
4. **Inadequate electric power supply:** poor power supply being experienced across the country is one of the challenges that rendered virtual teaching and learning programs ineffective in Nigeria. Students who live in the urban centers who are expected to have adequate power supply cannot boost of having it for at least 3 hours a day. On the other hand, there are thousands of students who cannot partake in virtual learning because they live in rural areas that do not have means of power supply at all (Ayebi-Arthur, 2017: Agbele, & Oyelade, 2020).
5. **Slow learners:** One of the weaknesses of virtual learning is that there is no direct communication between the learner and the educator. All students and learners are not the same, there are variations in their level of confidence, capabilities as well as understanding (Agbele, Oyelade, and Oluwatuyi, 2020). Some students who are slow learners may not comprehend easily without the teacher being around to put them through. Some of these slow learners depends on their friends to re-explain the concepts of what has been taught by the teacher, but now that they are isolated from others how will they manage the situation? These learners may never catch up with their peers and they will continue to feel the effect of this gap long after the pandemic has ended (Parkes, Stein, and Reading, 2015).
6. **Flexibility nature of online education:** Lack of personal attention on the side of students is a huge challenge facing virtual learning. Virtual teaching is too flexible that lazy students may never find

time to do it. Also, there is a low-level of readiness and seriousness among the students when it comes to finding time to attend online virtual class. Teachers are not visible to supervise and monitor what they are teaching, therefore students are free to do whatever they like with their time. Unless some students are being monitored by their parents, they will not be committed to virtual learning, instead their attention may be diverted and use the virtual learning period for other things like chatting with friends, watching movies, playing games etc.

7. **Difficulty in assessing the students:** Most of the schools that partook in online teaching during the lockdown found it difficult to assess their students (Watson, and Sottile, 2010). When the teacher give assignment, how will he mark it and feed the students back except the assessment questions are objective. Some universities that use online medium to teach their students could not conduct examinations (Agbele, Oyelade, and Oluwatuyi, 2020). During or after each online lesson, students and teachers found it difficult to interact by asking and answering questions.
8. **Network and internet connectivity problems:** Unavailability of proper digital tools, internet connections or Wi-Fi connections can cause a lot of setback due to which many students might lose out from the learning process. Digital equity is very crucial in this tough time but unfortunately, it is not every teacher and student that have access to digital services (Sambo, Ibrahim, & Oyelade, 2020). Virtual learning often requires a good and strong connection both for the educators and the learners, hence the low level of bandwidth connection is a fundamental limitation.
9. **Lack of conducive environments for learning:** Lack of conducive learning environments for students is a major setback to virtual learning program as students are easily distracted by noise and many other activities going on in their surroundings and could affect their academic performance [63]. Obed, Oyelade and Lateef, (2018) in Agbele, & Oyelade, (2020) opined that learning environment affects a child's ability to learn, and could be the determinative factor for some children as to whether they succeed or fail.
10. **Economic constraints:** The cost implication of virtual learning is another barrier to the effective implementation of the mode of education. Around 40.1% of Nigerians live below the national poverty threshold of N137,430 (\$354.66) per annum, which translates to N376.52 per day which is less than \$1 b (Parkes, Stein, & Reading, 2015). This suggests that the average Anambraian or Nigerian household cannot afford the financial requirements of virtual learning in terms of the technology tools like laptops, iPads, internet-enhanced mobile phones and data expenses.

Way Forward on Virtual Learning in Tertiary Institutions

Federal government needs to pay better attention to the development of the education sector as a fundamental component of the country's human capital development.

- a. **Improved funding to the educational sector:** There is urgent need to increase funding of the education sector of the economy in order to improve the educational quality and opportunities the nation. Starting from the federal government to the state government and down to the local government, there is need of increase in funding which will enable schools at all levels to be able to acquire technological tools such as laptops, iPads, internet-enhanced mobile phones and data expenses etc. for effective teaching and learning, especially in this covid-19 period with its attendant push for technology based learning and communication. Agbele and Oyelade (2020) stated that Nigeria's budgetary allocation to the education sector has consistently fallen short of the United Nations Educational Scientific and Cultural Organization (UNESCO) recommendation of at least 15%. The 2020 budget allocation for education was N686.8bn, 6.48% of the initial 2020 budget of N10.59 trillion. However, this has been reduced by 54% despite the increase in the revised 2020 budget to N10.81 trillion.
- b. **Increase electricity and internet connectivity:** The social distancing requirements brought about by COVID-19 have revealed the need to prioritize energy development issues in Nigeria (Daniel, 2020). This has implications for every sector of the economy including education. Improved electricity access and a stronger bandwidth connection in Nigeria will enhance the practicability of virtual learning in the country.
- c. **Training for Lecturers/Instructors:** Nigerian educators are generally inexperienced and lack proper training on the pedagogical approach to virtual learning.³² The traditional approach is still what is widely practiced in the country, hence, a re-orientation, computer and internet training, and review of teaching practices are required to bring teachers up to speed on virtual learning.

- d. Special attention on education mobile technology:** Special attention should be paid to use in education mobile technology and mobile tools. With the development of mobile devices and mobile software, students have the opportunity to use new forms of education. The process of learning becomes more fascinating, more comfortable. Availability to use mobile technology, regardless of the location provides significant advantages. Mobile tools and mobile technology contribute to the expansion of the perception of the material, stimulate the memory of the learner and develop communication skills (Pandey, 2015).

Conclusion

Virtual learning has become imperative in promoting and sustaining educational development globally considering the disruptive effect of the COVID-19 pandemic on traditional learning. Nigeria's education system is still largely built around traditional pedagogical learning, which is more focused on the physical learning environment, hence the low level of infrastructural development in Nigeria, in terms of energy and internet connectivity, which continues to constitute a setback for the adoption of virtual learning in the country. Tertiary institutions in Nigeria in general have also been negatively impacted by the lockdown imposed on schools during COVID-19 pandemic. Although some schools have explored several mediums to keep their students engaged during the lockdown, many students are disadvantaged due to the prevailing inequality in the socio-economy. Students whose parents are unable to provide them with the requisite technology tools and people living in rural areas, where connectivity is poor to non-existent may not be able to participate in virtual learning.

With the involvement virtual teaching, a large number of students can be taught by a single teacher at the same time. However, accessibility, affordability, flexibility, learning pedagogy, life-long learning, and unstable educational policies are some of the challenges that affect virtual learning. It is in line with these that the authors enumerated some creative solutions to the problems facing virtual method of teaching in Nigeria since it can be concluded that virtual teaching and learning is the panacea to educational disruption in the time of pandemic and crisis. Education should be viewed as a high government priority by increasing the awareness of pressing need for the students to be well equipped, especially those from low-income families, as this will benefit the state's economy in future.

Recommendations

This paper therefore recommends that:

1. Infrastructural facilities should be given adequate priority and funding.
2. Training of lecturers and student on the technical skills required for virtual learning should be given maximum attention.
3. Technological and online development should be prioritized by all stakeholders, parents, developmental partners, donor agencies and governmental ministries and department.
4. Tertiary institutions should be adequately strengthened so as to meet up with the global trends in teaching and learning.
5. The nation's indigenous technology should be adequately enhanced.
6. The problem of corruption in leadership should be aggressively tackled to create room for utilization of the nation's scarce resources towards the advancement of virtual learning and other technological development.
7. Government should make concerted effort to provide the enabling environment, by establishing virtual learning facilities in all tertiary institutions in the state.
8. It should be made mandatory for all lecturers and students to have computer and a way of providing soft loan either by institutions or government.

References

- Ajadi, T.O., Salawu, I.O., and Adeoye, F. A. (2018). E-Learning and Distance Education in Nigeria. *The Turkish Online Journal of Educational Technology – TOJET*. 7(4). 61–70.
- Agbele, A.T. and Oyelade, E.A., (2020). Impact of COVID-19 on the Nigerian educational system: strengths and challenges of online/virtual education. *Asian Journal of Education and Social Studies*. Vol. 13(1). 26-35
- Agbele, A.T, Oyelade, E.A, & Oluwatuyi, V.S., (2020). Assessment of students' performance in physics using two teaching techniques. *International Journal of Research and Scientific Innovation*. 27(3):100-107
- Almaiah, M.A. Al-Khasawneh, A. and Althunibat, A. (2020). Exploring the critical challenges and factor influencing the e-learning system usage during COVID-19 pandemic. *Education Information Technologies*. 25(2).
- Ajuwon, P.M., (2012). General Education Pre- Service Teachers Perceptions of Including Students with Disabilities in Their Classrooms. *International Journal of Special Education*. 27(3):100-107.
- Ayebe-Arthur K.(2017). *E-learning, resilience and change in higher education: Helping a university cope after a natural disaster*. E- Learning and Digital Media. Vol. 14(5).
- Azevedo, J.P., Hasan, A., Goldemberg, D., Iqbal, S.A and Geven, K. (2020). Simulating the potential impacts of COVID-19 school closure on schooling and learning outcomes: A set of global estimates. *World Bank Group Education*.
- Bozkurt, A. and Sharma, R.C. (2020). Emergency remote teaching in a time of global crises due to coronavirus pandemic. *Asian Journal of Distance Education* 15(1).
- Cojocariu V-M (2014). SWOT analysis of e-learning educational services from the perspective of their beneficiaries. *Procedia-Social and Behavioral Sciences*. Vol. 116 (0):1999-2003.
- Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects* 49. 91–96.
- Docebo. A. D. (2014). E-Learning Market Trends and Forecast 2014–2016 Report.
- Haghsheenas, M. A. (2019). Model for utilizing social software in learning management system of E-learning. *Quarterly Journal of Iranian Distance Education* 1 (4). 25–38.
- Harasim, L. (2012) *Learning Theory and Online Technologies* New York/London: Routledge
- Jones, I. S., and Blankenship, D. (2017). Students perceptions of online courses. *The Research in Higher Education Journal*. 32 (1).1-9.
- Kalyanasundaram, P. and Madhavi, C. (2019). Students' perception on e-learning – a study of online certificate courses. *International Journal of Psychosocial Rehabilitation* 23, 1
- Mamattah, R. S. (2016). Students' perceptions of e-learning. Thesis. Linköping University,
- McBrien JL, Cheng R, Jones P. (2009). Virtual spaces: Employing a synchronous online classroom to facilitate student engagement in online learning. *International review of research in open and distributed learning*. Vol. 10(3).
- Miks M, Mcilwaine J. (2020). Keeping the world's children learning through COVID-19. *Disponível em:.* Acesso em, 6(05).
- Littlefield J., (2018). The difference between synchronous and asynchronous distance learning;
- Obed R, Oyelade E, Lateef H. (2018). Indoor radon levels in some selected nursery and primary schools in Ibadan, Oyo State, Nigeria. *Journal of Radiation Research Applied Sciences*.;11(4): 379-382.
- Oluwatuyi V.S.(2020). Covid-19 In Ekiti State Nigeria: Why should we worry? *International Journal of Research and Scientific Innovation*. Vol. 7(6):146-149.
- Olcott, D. (2020), Going online: Life in the online fast lane or so the story goes. *Asian Journal of Distance Education* 15, 1 180–184.
- Pandey, K. (2015). Handbook of Mobile Teaching and Learning, In Expectations from future technologies in higher education. pp 829-834
- Parkes, M, Stein, S. & Reading, C. (2015). Students' preparedness for university e-learning environments. *The Internet Higher Education*. 25: 1-10
- Sambo, M.A.H, Ibrahim, M.O, & Oyelade, E.A (2020). Basic science and technology curriculum

- issues in Nigeria: An exploration of policy option for improved delivery. *Lafia Journal of Education*. 1(1). 95-107
- Singh V, and Thurman A.(2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). *American Journal of Distance Education*. Vol. 33(4):289-306.
- Watson, G.R. & Sottile, J., (2010). Cheating in the digital age: Do students cheat more in online courses?. *International Journal of Research and Scientific Innovation*. Vol. 27(3).