# Acquisition of Technical Skills as a Strategy for Addressing Youth Restiveness in Niger State, Nigeria

Ibrahim Ishaq Izom*[1] Ahmed Shehu[2], Abdullahi A. M. Yassar[3] and Mamman Ruqayyat Momoh[4]
[*1]Department of Electrical Engineering Technology,
[2]Department of Building Engineering Technology,
[3]Department of Mechanical Engineering Technology,
Minna Institute of Technology and Innovation, Niger State, Nigeria
[4]Department of Guidance and Counselling, National Open University of Nigeria

**Abstract**

In Nigeria, youth restiveness has become a hot topic for discussion in the social, economic, and political realms. It is a fact that a restive youth population in Niger State will prevent the state from thriving and progressing significantly. Because of the frequency of this problem, Nigeria's peace, security, and corporate existence as a nation are jeopardized. Unemployment, a lack of basic and inadequate infrastructure, and poor social amenities are among the causes of youth restlessness, as are a lack of technical skills to engage them in becoming self-reliant. Technical abilities serve as the foundation for future science teaching and learning at all levels of education. The low number of autonomous or self-sufficient adolescents in science and technology from higher education institutions indicates that there are little or no skills teaching in science and technology, which has raised a lot of concern. Science and technology are constantly reducing the world to a global village. As a result, it is necessary to mobilize as many youngsters as possible, as well as teachers, to learn and impart science skills. As a result, this article emphasizes the importance of various talents and interests in tackling youth restiveness in Niger State. It covers skills acquisition methodologies, how to demonstrate such talents, how to persuade adolescents to learn science and technological skills, and how to assist youths in practicing their new skills. There are suggestions on how stakeholders might participate in the crusade that is so important for youths.

**Keywords:** Skills, Youth, Niger State, Unemployment restiveness

---

## Introduction

Youth is a stage of transition from youthful dependence to adulthood's freedom and awareness of the necessity to collaborate with other members of society to attain the society's goals and objectives (UNESCO 2017). At this point, both educated and uneducated youths are determined to find long-term jobs to assist them meet their basic necessities. However, the percentage of youth in society is growing, resulting in higher unemployment rates and a higher level of dependency. It is critical to emphasize that youths' strength, labor, and efforts are valuable assets in a healthy social environment. Positive contributions aid in a location's growth and development. Youth has a crucial role in any culture (Akosah-Twumasi, Emeto, Lindsay, Tsey, Malau-Aduli, 2018).

Youths play a variety of roles, including maintaining law and order, preserving societal culture, promoting knowledge, participating in communal politics, developing projects, attending cultural festivals, participating in local sports events, and participating in traditional marriages and funerals, among others (Ikpa and Igbo, 2013). The restlessness of adolescents has resulted in their incapacity to solve problems, efficiently fulfill tasks, and meet societal goals. As a result, kidnapping, vandalism of oil pipelines, an increase in armed robbery, bomb assaults, thuggery, murder, property destruction, increased insecurity, and crude oil theft (bunkering), to name a few, have become commonplace among adolescents (Anho, 2014). All of the aforementioned crimes are inextricably linked to a lack of employable technical abilities that young people are supposed to possess. The acquisition of technical skills has long been recognized as critical to the human race's survival and progress (Brewer, 2013). The importance of science and technology in the educational process backs up this notion. At all levels, science and technology are integrated into all nations' educational systems. There are appropriate techniques for acquiring skills in these fields of information as bodies of knowledge. The Nigerian government, through its education policy, strongly encourages the teaching and learning of science and technology in primary schools (Nbina, 2011).

The National Policy on Education's provisions for primary education (2012) specifically state the following objectives: Create a solid foundation for scientific and critical thinking. Provide opportunities for the youth to develop manipulative abilities that will enable him to function effectively in society within his limitations. Provide the youth with the necessary tools for further study, including preparation for local trades and crafts. The government has mandated that the following disciplines be included in the primary school curriculum in order to interpret the aims related to scientific and technological endeavours. Science, which can be interpreted as primary science, integrated science, general science, or simply science; Mathematics, which aids in the development of reflective thinking; Physical and Health Education, which promotes the development of a healthy mind and body; Agriculture/Home Economics, which can be viewed as an applied science that easily relates to the child's immediate society; Cultural and Creative Arts, which include drawing and handicrafts, among other things, as a means of preparing the child for the future; These two endeavors are commonly referred to as local crafts, and are viewed as one of the foundations for technology at this level of schooling (OECD, 2016).

Yao-Ting, Kuo-En and Tzu-Chien (2016) at the time, it appears that the science and technology program in elementary school is not well-articulated enough to stimulate the acquisition of relevant skills. This is due to a variety of reasons, including the following:

i. Insufficient employees with necessary competence in the teaching and learning of science and technology at the primary education level;
ii. Absence of special programs and projects in science and technology for primary schools that have as their goal the use of selected media for skill acquisition. Poor technique of teaching science and technology in elementary schools, where the cognitive domain appears to be overemphasized to the neglect of the other domains;
iii. Inadequate implementation of science and technology curriculum provisions in primary schools in Nigeria, where a little science is done sparingly and almost nothing is done in the area of technology due to a variety of factors including: an absence of trained teachers to handle the subjects;
**iv.** A lack of equipment for the practice of agriculture; a lack of collaboration and motivation from experts in local craft; and the lack of any arrangement to coordinate and/or integrate practices in craft. Absence of proper values education in many primary schools, where the provision for handwork, handicraft, and agriculture has been ditched for flimsy reasons; absence of learner-friendly atmosphere in many primary schools, particularly with regard to science and technology. To prepare children for future activities and contributions to national development, we must teach them scientific and technological abilities. The remainder of this work focuses on: Scientific and technological abilities, Learning strategies, and Demonstration; Encouraging students to develop new skills. Assisting students in practicing new skills. Nigeria's challenges in acquiring scientific and technology capabilities for Vision 2020.

**Technical skills**

There is a huge presumption that because primary school students are taught fundamental science, they do not need to learn primary technology. Science and technology are thought to be inferior variables in education, especially at this level (Gómez-Fernández and Mediavilla, 2022). However, there is a significant contrast between technology and science that curriculum planners and instructors should be aware of. Technology is concerned with harnessing resources or materials, energy, and natural phenomena to attain some goal related to human activity, whereas science is concerned with comprehending the world around us. The distinction between the purposes is crucial. Understanding is the primary goal of scientific endeavors, whereas solving a problem that meets a human need is the primary goal of technological pursuits (Iaccarino, 2001).

Yet, in order to fulfill the goals, some form of contact is required. Teaching simply science in primary school instead of technology is an oversimplification of the primary school curriculum, as it provides neither the gratification of actual problem solving nor the intellectual stimulation of study for the sake of understanding or gratifying curiosity (Nbina, 2011). The compromise takes the shape of science-oriented activities, in which applications of scientific principles in everyday life are investigated from the standpoint of demonstrating the utility of science rather than the problem that was solved (Schauz, 2014). Furthermore, rather than isolated issues to be answered, activities in elementary classes take the shape of series. While each of these activities may be entertaining, they do not allow youths to develop ideas that will aid their understanding and solution of future difficulties. Technology is best grasped by young children through engagement that is based on understanding (Marshall, 2017).

The use of the nature of knowledge in technology adds to this understanding. It is required that individuals learn both processes and products in the pursuit of mastering science and technology so that they can apply them to addressing challenges for the betterment of society. Referring to processes and skills is instructive since skills emerge from the various procedures. Science skills are presented by Firdaus, Suratno and Fikri (2018) as process-based. An examination of science curricula, particularly primary science curricula, reveals that the actions and behaviors listed below define the skills expected of science learners. He outlined what each student should be able to accomplish by the end of primary science. The skills are carefully created and implemented through a variety of activities. Observing, classifying, measuring, recording, hypothesizing, creating experiments, controlling variables, manipulating, employing models, interpreting data, inferring, concluding, generalizing, and predicting are examples of technical skills.

The expected behaviour changes from scientific students are so specific in terms of what they can do that they provide a clear focus for professors who may be unsure of what to teach or who may be tempted to produce themselves in their learner. The skills described can be gained and exhibited by a primary school teenager if appropriate activities are planned and presented to the school pupils. While science abilities are described as process-based, technology skills are described as manipulative-based. This is due to the fact that technologists are usually involved in overt acts, such as manipulating materials and machinery to achieve a desired effect. Technology-based abilities, on the other hand, are not mutually exclusive with science-based talents. Some scientific abilities are evident in the field of technology, and the reasons for this are self-evident. Pedersen, Johansen and Jøsang (2018) argue that science and technology are two sides of the same coin. The majority of technical skills are observable behaviors that occur from the manipulation of tools, equipment, and machinery in some way. In the surroundings, there are numerous activities from which adequate experiences for skill acquisition can be derived. It is the responsibility of the technology instructor to guarantee that the activities offered to the students are those that are characterized by the skills that the students are supposed to learn.

It should be noted that the abilities are arranged in a hierarchy, and even within a single talent, there are several levels of sophistication or difficulty. According to Firdaus, Suratno and Fikri (2018) a talent is usually considered acquired if it can be demonstrated accurately at least two out of every three times when demand is made. In terms of quality, at least for a start, the two-thirds rule is essential. As skill demonstration improves with time and practice, even more demand is made in later phases. Because the intended material mastery and attitudinal changes are targeted toward the student, a learner-centered method is highly recommended for teaching and learning science and technology. As a result, we must encourage children to: Locate sources of relevant information and be able to obtain them for their use; Interact with materials provided with the goal of extracting valuable information from them; Collaborate with peers to explore the environment; Participate in field trips and industrial visits; Be actively involved in science and technology processes to acquire the related skills among others.

**Approaches for skills acquisition**

There are a variety of techniques to teaching science and technology that can lead to the acquisition of associated skills. In this context, we have already mentioned the need of a learner-centered approach.

- Another method for developing abilities is problem-solving.
- The relevance of science and technology is highlighted in this context, and technological principles will be taught in science classes.
- According to Samaniego, Gonzalo, Esteve-González and Vaca (2015) science and technical skill provides a roadmap for achieving scientific and technological literacy by emphasizing individuals' responsible decisions in the real world of science and technology.
- Developing the ability to think critically about and analyze events in society using techno-scientific methodologies;

The Anjum (2020) has identified eleven characteristics of programs that highlight the priority of instruction above curricular content. The emphasis on process skills, which students may utilize in their own issue solving, is a very relevant and vital characteristic. The approach should not be considered without reference to the program's features (Bob, David and Stephen, 2019) and its effective implementation in scientific teaching has been urged to focus on five factors: Learner friendly environment; Inventiveness; Learner-centered method; Problem-solving focus; Useful resource organization

Teachers must create settings where students will need the essential concepts and process abilities in order to effectively employ the approach in science instruction. Students' learning abilities are stimulated in this way, and this sort of learning is consistent with the Constructivist Learning Model (Shah, 2019). The model explains that knowledge is never independent of the observer. It necessitates: a personal commitment to question; a personal commitment to explain and test explanations for validity; and each learner's ability to piece together concepts and structures that have personal meaning in order for learning to occur.

According to Joseph and Lawrence (2016) using the constructive model effectively entails using teaching strategies that include the following specific procedures:

1. Planning activities, which include identifying and using students' questions and ideas to guide lessons and entire instructional units, accepting and encouraging students' initiative, and promoting students' leadership, collaboration, information retrieval, and action as a result of the learning process.
2. Classroom methods, such as incorporating students' ideas, experiences, and interests into courses; encouraging the use of alternate sources of information, such as written materials and live experts; and asking open-ended questions;
3. Students' activities, which include encouraging students to expound on their questions and responses, suggesting causes for events and circumstances, and putting their own views to the test.
   For example, answering their queries and speculating on the cause, as well as anticipating specific outcomes;

4. Teaching technique, which includes seeking answers to students' ideas before presenting teacher ideas or studying ideas from other textbooks or sources; encouraging students to challenge each other's conceptualizations and ideas; and using cooperative learning strategies that emphasize collaboration, individuality, and division of labour tactics.

Allowing sufficient time for reflection and analysis; appreciating and using all ideas generated by pupils; and fostering self-examination of real evidence to support views; and reforming beliefs in light of fresh experience and evidence.

Constructivist professors categorize these tactics into four groups:

i. Invitation, which entails observing one's environment for points of interest, as well as asking questions, considering possible responses to questions, noting unusual phenomena, and identifying circumstances in which student perspectives differ.
ii. Exploration, which is engaging in concentrated play to explore various alternatives, gather and organize data, look for information, experiment with materials, observe specific phenomena, construct a model, and brainstorm possible alternatives use problem-solving tactics, choose relevant resources, discuss solutions with others, evaluate options, debate issues, identify risks and implications, set investigation parameters, and analyze data
iii. Taking action, such as making decisions, applying knowledge and skills, transferring knowledge and skills, sharing information and ideas, asking new questions, developing products, and promoting ideas, by communicating information and ideas, constructing and explaining a model, constructing a new explanation, reviewing and critiquing solutions, determining appropriate closure, and integrating a solution with existing knowledge and experience.

**Demonstration**

Demonstration is the most common way for teaching new abilities to students. The topic of technology studies necessitates a great deal of skill learning. Demonstration is the process of teaching a learner how to do a skill. While the learners watch, the teacher puts on a show. This appears to be straightforward (Lokanath, Tushar and Abha, 2020). However, unless certain safeguards are taken, it may lose its usefulness. According to Hurst, Wallace and Nixon (2013) demonstration gives best result when students feel a need to learn new content. To get the student feel the need, they suggested that the knowledge content related to the demonstration should be taught first. After determining the requirement for the new skill, the teacher should review the lesson's specific objectives. This simplifies the preparation and delivery of the new skill lesson. Many demonstrations fail because the beginning and end of the demonstration are not predetermined by the teacher. Before the demonstration begins, every item (machines, tools, equipment, chart, drawing, instructional sheet) that is required to enable a smooth and uninterrupted demonstration should be on hand and correctly placed. During a demonstration, the item should be placed in such a way that it does not catch the attention of the pupils. These elements should be visible at the moment they are required. Students must be seated in the most efficient and pleasant manner possible so that they may all view the demonstration without being obstructed. The demonstration's surroundings must be made pleasant, quiet, and distraction-free.

It is critical to provide an explanation of the demonstration's purpose. The focus of the explanations should be on the demonstration's goals and principles. Learners should be taught exactly what they will achieve from participating in the demonstration.

i. There are usually multiple options when it comes to completing a task. A good demonstration should begin with one step or procedure at a time, and each section should be executed slowly enough that the vital aspects are not missed.
ii. Typically, a good demonstration is accompanied by explanations and questions. Explanations help to reinforce the presentation's points, while questioning helps to determine how well the learner comprehends and follows the demonstration.
iii. These rules, when followed, can help to make the teaching of new abilities more effective, especially if the demonstration is closely followed by the activities of the students.

Asha, Balasubramanian and Alexis (2019) distinguished two types of skill-learning models. There are two types of models: traditional and enhanced. Learning through imitation and guided learning are two traditional paradigms. This paradigm is only useful for learning elementary processes. Learning complex skills that are highly organized and sequenced is difficult using the traditional model; learning a skill through imitation cannot assist learners in acquiring the technical information needed before practicing the skill, and directed learning inhibits information on why a skill is being learned. The following are some of the components of the updated model: Cluster model, Tell them model, Task-instructional model and Complimentary Model.

The complementary model involves imparting skills to newcomers using more than one style of teaching or practice. As a result, the methodologies or procedures are complementary. This paradigm is demonstrated by using charts, explanations, and questioning to enhance a demonstration. Closely linked skill components of a trade are brought together in a clear and intelligible way in the Cluster model. This strategy includes allowing pupils to practice a skill right after the teacher has demonstrated it.

The Tell-them model is commonly used to motivate a group of people who are interested in improving their abilities in valuable jobs. The approach is ideal for a student whose skills have become obsolete and who wishes to learn a new one. When an individual exhibits some amount of ambiguity about the skill to learn or about a skill of interest, the tell-them model of skill training is applied. The teacher then has the task of informing the student of whatever he or she needs to know about the talent in order for the student to make an informed decision. The person is told what to do in this model.

In order to present abilities to beginners, the task instructional model employs a problem-solving technique.
Problems and solutions for tackling them are identified in problem solving. The methods that have been identified are put to the test, and their efficacy is determined. This model is used to teach learners how to carry out or repair jobs using a systematic way. The models have illustrated the various circumstances in which talents can be acquired. Understanding why people want to master a skill will aid in the implementation of each model correctly. When the models are used correctly, skill learning results in firing without missing the target.

**Motivating Youths to Acquire Skill**

Because of the importance of skill acquisition in technology education, every effort should be made to instill in the learner a desire to gain skills. Unless the students are physically and intellectually prepared to learn, even the best teacher's strategy may fail to result in good learning. This condition of preparation must emerge from inside the students and cannot be imposed by the teacher. Successful teachers just take advantage of such a situation when it presents itself. Of course, this does not imply that the teacher should wait until a learner's whim causes him to be ready to learn before presenting learning. The teacher can then do a number of things to encourage students to be ready to master new skills:

i. When students demonstrate an interest in learning, the teacher must teach a skill. Simple to complex skills are graded. Presenting complex material to young or adult learners can lead to frustration and a lack of interest in the material.
ii. To encourage students, a teacher must exhibit a high level of competency in the performance of the skill to the point where it becomes a way of life or a game for them.

The uncertainty that surrounds some skill performance is removed when the theory that drives the performance is linked to actual practice. This allows learners to accept that they can do it. The learner's understanding and willingness to practice grows when the teacher makes the facts, the idea, and the relationship of the theory to the practice plain to them.

i. Learners of skill develop a need to study in a practice environment that reflects their actual job situation. The environment in which a skill is taught is similar to the one in which the learner will encounter in the workplace.

ii. Production jobs, not phantom employment, are used to incentivize youths. Learners will put out all of their effort to master a skill that will result in the creation of an article that they will see and likely use in their homes and other locations.
iii. If learners are given appropriate explanation and knowledge about what they are to learn, the teacher has a high success rate in teaching them to acquire skill. It is not enough to show competency in a skill; trainees should be instructed when and when they can apply it.

**Assisting Youths to Apply New Skills**

Linda, Lisa, Channa, Brigid and David (2020) have provided helpful tips on how to assist youths in correctly practicing new abilities. When learners first wish to practice a new skill, it is critical that they take the proper steps. This is due to the fact that skill performance is based on habit knowledge, which is formed through practice. As soon as the demos are over, the teacher should give the students something to practice with. These aid learners in imitating the steps taken by the teacher in accomplishing the skills since the mental image of what the teacher performed is still fresh in their minds. Allowing a time lag would allow other activities to intervene, potentially blurring the learners' thinking. The new skill should be correctly practiced on the first try.
This establishes the habit of appropriately completing the skill. However, it should not be anticipated that new learners will succeed flawlessly on their first try. Taking the proper steps and employing the proper tools when doing a skill are important indicators of proper execution. Perfection could be achieved with more practice on the first attempt. A job sheet, also known as an operational sheet, is a tool that helps a learner master the operation of a skill. The operational sheet contains the sequence of operations that learners can follow to master a skill even if they do not have access to a tutor. Learners can progress at their own pace with it as they practice the new skill. The teaching and

development of practical skills is increasingly focusing on production jobs. A production job is a real-world commercial job, product, or article on which the student works to achieve mastery in the skills he or she is learning.

Importantly, as the students are practicing the skill, the teacher must keep a close eye on them. Some teachers have the inclination to act as though demonstrating a skill, providing equipment, supplies, and an operation sheet are all that is required for learners to practice it. Learners who are working on a skill require close observation, correction, questioning, advice, and assistance. Only if the teacher is present while learning and practicing the skill can this be done. Teachers frequently forget that they might be prosecuted with carelessness of duty if learners sustain bodily injuries during a skill practice session or if any other avoidance incident occurs.

**Nigeria's Technical Skills Acquisition Challenges**

The foundation for the rest of the educational system is the primary level of education. Nigeria's search for scientific and technological advancements; Breakthroughs can only be achieved if primary school students are taught to have a positive attitude toward science; the following procedures can be taken to archive this:

In primary schools, only NCE graduates in the basic sciences should teach science, followed by in-service training; All primary schools should have a science laboratory where youth as a student can interact with scientific objects; Curriculum reform is required, with both the content and approach of the existing curriculum being examined; Primary schools should have a computer lab to help students build computer appreciation abilities. Science teachers in primary and secondary schools need to expand their knowledge of science. Primary school science instructors require good and ongoing professional development. Recognize that, within the context of education, science and technology include human progress toward a more wealthy and equitable future.

It is necessary to recognize that global science and technology networks serve as a platform for bringing together relevant social and professional communities in order to facilitate the expansion of concerted international collaboration in order to effectively address the challenges of scientific and technological skills acquisition. The government must generate the political will to address educational issues in general, as well as the issue of teachers and professional development for teachers in particular. An effective teacher has the same right to a reasonable income and working conditions as a civil servant with the same or similar qualifications and experience. This will allow him to properly carry out his responsibilities.

**Conclusion**

Technical education is vital at all levels of education. This is backed by the critical role that science and technology play in any nation's progress. Science and technology skills can be learned by youths. Youths are frequently involved in daily tasks that necessitate the use of scientific and technological skills. We've discussed why science and technology should be taught and learned, as well as the abilities that should be obtained through appropriate exposure to connected and right situations. We have talked about skill acquisition methodologies and, in particular, how to employ the STS approach in this context. There are acceptable approaches to teaching competence, whether as a process or as a manipulation, for science and technology teachers. Knowing the best strategy to take, the mistakes to avoid, the tactics for motivating skill learners, the skills to teach, and the best ways to assist learners practice the skills they have learnt is key to success in teaching skill. This will go a long way toward putting young people to work and assisting in the development of answers to some of the society's challenges.

**References**

Akosah-Twumasi, P., Emeto, T. I., Lindsay, D., Tsey, K., Malau-Aduli, B. S (2018). A Systematic Review of Factors That Influence Youths Career Choices—the Role of Culture. Frontiers in Education , 3, www.frontiersin.org/article/10.3389/feduc.2018.00058 DOI=10.3389/feduc.2018.00058.

Anho, J. E. (2014). Entrepreneurship Education: A Panacea for Unemployment, Poverty Reduction and National Insecurity in Developing and Underdeveloped Countries. *American International Journal of Contemporary Research*, 4, 3, 124 – 136.

Anjum, S. (2020). Impact of internship programs on professional and personal development of business students: a case study from Pakistan. *Future Business Journal*, 6, 2 . https://doi.org/10.1186/s43093-019-0007-3.

Asha, K., Balasubramanian, K. and Alexis, C. (2019). Changing the TVET paradigm: new models for lifelong learning, *International Journal of Training Research*, 17:sup1, 54-68, DOI: 10.1080/14480220.2019.1629722

Bob, H., David, H., and Stephen, P. (2019). Policy failure and the policy-implementation gap: can policy support programs help?, Policy Design and Practice, 2:1, 1-14, DOI: 10.1080/25741292.2018.1540378.

Brewer, L. (2013). Enhancing youth employability: What? Why? and How? Guide to core work skills / Laura Brewer; International Labour Office, Skills and Employability Department. - Geneva: ILO.

Federal Republic of Nigeria (2012). *National Policy on Education* (4th Ed.) Lagos: NERCD

Firdaus, F., Suratno, S., & Fikri, K. (2018). The Effectiffeness of The Process-Based Skills Approach of Lesson Study Toward Achievement In Biology of Vocational School Students. Pancaran Pendidikan. 7. 10.25037/pancaran.v7i2.180.

Gómez-Fernández, N., & Mediavilla, M. (2022). Factors Influencing Teachers' Use of ICT in Class: Evidence from a Multilevel Logistic Model, {Mathematics, 10, 5, 799. www.mdpi.com/2227-7390/10/5/799.

Hurst, B., Wallace, R., & Nixon, S. B. (2013). The Impact of Social Interaction on Student Learning. Reading Horizons: A Journal of Literacy and Language Arts, 52 (4).

Iaccarino, M. (2001). Science and ethics. As research and technology are changing society and the way we live, scientists can no longer claim that science is neutral but must consider the ethical and social aspects of their work. *EMBO reports*, *2*(9), 747–750. https://doi.org/10.1093/embo-reports/kve191.

Ikpa I. and Igbo H.I (2013) Causes, Effects and Ways of Curbing Youth Restiveness in Nigeria: Implications for Counseling. Journal of Education and Practice 4 (6): 131-137.

Joseph, P. A. and Lawrence, A. B. (2016). Using Constructivist Teaching Strategies to Enhance Academic Outcomes of Students with Special Needs. *Universal Journal of Educational Research*, 4, (2), 392 - 398.

Linda D., Lisa, F., Channa, C., Brigid, B., & David, O. (2020). Implications for educational practice of the science of learning and development, Applied Developmental Science, 24:2, 97-140, DOI: 10.1080/10888691.2018.1537791

Lokanath, M., Tushar, G., & Abha, S. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open*, 1, doi.org/10.1016/j.ijedro.2020.100012.

Marshall, C. (2017). Montessori education: a review of the evidence base. *npj Science Learn* **2,** 11. https://doi.org/10.1038/s41539-017-0012-7.

Nbina, J. B. (2011). Scientific and Technological Skills Acquisition at the Primary School Level as a Strategy to Mitigating the Challenges of Vision 2020 in Nigeria. An International Multidisciplinary Journal, Ethiopia, 5 (6), 23, 334-349.

OECD (2016), Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills, OECD Publishing, Paris.dx.doi.org/10.1787/9789264265097-en.

Pedersen, T., Johansen, C. & Jøsang, A. (2018). Behavioural Computer Science: an agenda for combining modelling of human and system behaviours. *Hum. Cent. Comput. Inf. Sci.* **8,** 7. https://doi.org/10.1186/s13673-018-0130-0.

Samaniego, E., Gonzalo, N., Esteve-González, V.,& Vaca, B. (2015). Teaching and Learning in digital worlds: strategies and issues in higher education, 129-136.

Schauz, D. (2014). What is Basic Research? Insights from Historical Semantics. *Minerva* **52,** 273–328 . https://doi.org/10.1007/s11024-014-9255-0.

Shah, R.K. (2019). Effective Constructivist Teaching Learning in the Classroom." Shanlax. International Journal of Education, 7, 4, 1–13.

UNESCO (2017). *Learning to Live Together: What Do We Mean by "Youth"?* Available online at: http://www.unesco.org/new/en/social-and-human-%20%20%20sciences/themes/youth/youth-definition/.

Yao-Ting S., Kuo-En, C., & Tzu-Chien, L. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis, *Computers and Education*, 94, 252 – 275.