A Critique of Skills Acquisition in the National Open University of Nigeria (NOUN)

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Abstract

Open and Distance Learning has reportedly been very successful globally. The Open University, UK, the Indira Gandhi National Open University of India, and the University of South Africa (UNISA) are a few ODL institutions with testimonies of significant success. The National Open University of Nigeria (NOUN) was established to further widen the opportunities for tertiary education in Nigeria. There is high demand for both knowledge and skills in the Nigerian education system, but as a developing country, there should be a higher priority in turning existing knowledge to skills than simply extending the frontiers of knowledge. It has been reported in the literature that the use of ODL in transmitting certain skills may present some challenges (Burns & Kretlow 2007). As an industry partner to the African Centre of Excellence on Technology Enhanced Learning (ACETEL), a centre in NOUN, this investigator takes a critical look at how ACETEL engages the challenges of skills acquisition via ODL.

Keywords: Open and Distance Learning, Skills Acquisition, Technology-Enhanced Learning, ACETEL, Higher Education and Development

Introduction

Skill describes the ability to perform tasks or carry out activities effectively and efficiently. Though related and complementary, it contrasts with knowledge in many significant and important ways. In contrast to skill as an ability, knowledge is about understanding rather than doing. Hence, while knowledge is theoretical in nature, skill is practical in essence. Knowledge may be acquired passively by listening and observing, or actively by reading and studying, skill however, is necessarily acquired actively by repetitive practice, leading to competence by experience.

Knowledge may be demonstrated by recalling, explaining and discussing, but skill is demonstrated by performance. Consequently, while knowledge is about "know what", in relation to factual, declarative, and propositional information, and "know why", regarding principle-based conceptual and causal understanding of phenomena, skill is concerned with "know how", which relates to the practical ability to carry out procedures, based on functional capacity to achieve set goals.

Skill and knowledge constitute a complementary pair, and skill itself can also be perceived within some broad categories. One category is the category of cognitive skills. This category includes memory and recall skill, critical thinking skill and problem-solving skill. Also relevant are decision-making skill, attention and concentration skill as well as logical reasoning skill. Another category of skills is psychomotor. As the term implies, this category of skills is associated with the brain, together with the nervous and muscular systems in coordinating functional motion of parts of the human body. This category of skills usually employs muscle memory, acquired by learning, to achieve distributed processing, for quick and efficient response. Beyond these two categories of skills, there are many other categories including interpersonal or social skills, technical or domain-specific skills and soft skills. Yet another category of skills that has recently become significant, owing to the information revolution is the category of digital literacy skills. Digital literacy skills are related to the ability to use common computer operating systems and office

productivity software tools such as Word Processors, Spreadsheets, Database Systems as well as presentation and time management tools. Also important are the ability to navigate the Internet, manage online identity, use social media and anticipate cybersecurity. While all these categories of skills are important for productive living in the modern world, cognitive and psychomotor skills, as well as digital literacy skills shall be the focus of this study.

Bloom's Taxonomy is a hierarchical classification scheme that offers an effective framework for engaging the productive acquisition of knowledge and skills. It structures learning objectives into three domains: cognitive, psychomotor and affective domains. The cognitive domain is concerned with knowledge-based mental skills, the psychomotor domain addresses skills for manual tasks required for a coordinated engagement of the physical world, while the affective domain addresses emotional intelligence, values and attitudes. Based on the decision to focus this study on cognitive, psychomotor and digital literacy skills, we shall restrict our consideration of Bloom's Taxonomy to the cognitive and psychomotor domains.

The acquisition of knowledge can be perceived from the point of view of the cognitive domain of the Bloom's Taxonomy, while the acquisition of skills can be perceived from the point of view of both the cognitive and psychomotor domains. Hence, there is a need to further break down the problem of skills acquisition to two main subcategories based on their relevance to the cognitive or the psychomotor domains. Complementary to the acquisition of knowledge in the cognitive domain, the acquisition of cognitive skills such as memory and recall, as well as critical thinking and problem-solving skills, also properly belong to the cognitive domain. Furthermore, part of the cognitive domain are decision-making skills, concentration skills as well as logical reasoning skills. Psychomotor skills, however, naturally belong to the psychomotor domain. Even though basic skills, such as the use of the computer keyboard as well as the manipulation of the mouse and other physical computer devices fit into the psychomotor domain, digital literacy skills belong essentially to the cognitive domain.

Open and Distance Learning has been used effectively in the process of acquiring skills in the cognitive and affective domains. However, the acquisition of some psychomotor skills tends to pose some challenges. This is because psychomotor skills usually involve physical coordination, manual dexterity, real-time feedback, and other facilities that may be challenging to deliver remotely. Various studies have considered the challenges of acquiring psychomotor skills via ODL (Burns & Kretlow 2007, Che *et al* 2023, Mayuze *et al* 2023, Rahim *et al* 2023).

The knowledge-skill dichotomy therefore has implications for Open and Distance Learning (ODL). Even though the passive and active acquisition of knowledge can be easily achieved by ODL within the right environment, the acquisition of certain types of skills by ODL demands careful consideration. Of relevance in this light, Simpson (1972) outlines seven skill development levels within the psychomotor domain, starting from basic sensory awareness and building up to complex creative motions.

Knowledge and Skills in the Service of Development

Development is a complex multifaceted positive change phenomenon characterised by social, environmental, political and economic objectives (Adegbola, 2009). We may view development therefore, as a process that creates growth, progress and positive change in the environmental, social, economic and demographic circumstances of a people, without damaging the natural environment. Iwayemi (2001) states that development is about creating a better world for all citizens based on advances in skills, knowledge and capability.

Nigeria is essentially a pre-industrial developing nation. Even though there have been significant efforts at industrialisation, the country still remains in the main, agrarian, farming crops and rearing animals. She earns the bulk of her living by selling raw materials, either as barely processed farm produce and crude natural resources to the world, with little or no added value. Moving away from this rather base state demands a type of education that can provide necessary knowledge and skills. The type of education that supports industrialisation. While

Nigeria is still questing for a transition from the agrarian state to the industrial state of development, the information age has arrived demanding digital literacy skills as basic life skills on the one hand and professional skills on the other hand.

Much of the knowledge required to transit from an agrarian to an industrial society and further on to the global information society is easily available to global scholarship. Hence, the need for extending the frontiers of knowledge may not necessarily be the preoccupation of the developing world, in its quest to transit from the agrarian to an industrial society. The challenge of priority is how to develop useful skills from available knowledge.

Development demands creative, effective and efficient exploitation of natural as well as human resources. Basic creativity produces crafts. Crafts are contraptions, human creations that appeal to the senses. They may or may not have practical functional applications, but they serve to excite human imagination, at least at the level of aesthetics. The application of the science of engineering to crafts produces technology, which is the effective and efficient exploitation of natural principles to create useful products, processes, goods and services that behave predictably within pre-defined design criteria.

The creative process of producing crafts, all the way to turning the crafts into technological artifacts demand both skills and knowledge. Even though knowledge is required to make effective and efficient products, processes, goods and services that behave predictably according to pre-defined design criteria, the fundamental basis of their being are the skills that go into their creation. This brings to a sharp focus the exceptional need for skills to produce the technologies needed for development. Technology addresses the needs created by culture. The questions it answers are raised by culture and the problems it solves are formulated by culture. Hence, the skills demand of a people is inextricably tied to their culture; their ways of life and the needs created by these ways of life.

Tertiary Education in Nigeria

Tertiary education in Nigeria has become overbearingly affected by a youth bulge, characterised by a disproportionately large share of young people in national population. According to UNFPA (2022), over 60% of Nigeria's population is under the age of 25, and more than 30% are between 10 and 24 years of age. This demographic manifestation has had wide-ranging social, economic, and political implications for the country. One area in which this youth bulge has had to be creatively accommodated is the education system.

A rather significant response to the youth bulge in the education sector is the establishment of the National Open University of Nigeria (NOUN), with the mandate to provide accessible, flexible, and lifelong education to Nigerians through open and distance learning (ODL). The core mission of NOUN is to expand access to higher education and support national development goals by leveraging technology and innovative delivery methods.

The establishment of NOUN as a response to the Nigerian youth bulge should be viewed critically from the point of view of the implications of ODL on the knowledge-skill dichotomy. In other words, from the foregoing, and considering the acknowledged challenges in the acquisition of psychomotor skills by ODL, to what extend is an institution such as NOUN able to fill the national skills gap? Owing to the difficulties in obtaining the levels of real-time feedback required to develop physical coordination and manual dexterity remotely, can NOUN play a significant role in bridging the Nigerian skills gap?

In answering this question, it must be acknowledged that the establishment of a national open university is not the only response to the effect of the youth bulge on tertiary education in Nigeria. Many other 'brick and mortar' universities were also established around the same period within when NOUN was established. This suggests a multi-pronged attack of the problem that NOUN was established to address. While NOUN may concentrate on delivering skills other than core psychomotor skills, and other institutions, particularly brick and mortar universities and polytechnics attend to delivering core

psychomotor skills, NOUN's disposition to the delivery of psychomotor skills still needs to be considered.

NOUN Response

In accordance with the above conjecture, it appears that NOUN has deliberately avoided courses of study that put emphasis on the development of core psychomotor skills. Particularly known for its open and distance learning (ODL) approach, NOUN provides flexible learning options for students in wide ranging undergraduate, postgraduate, and professional courses in Arts, Sciences, Education, Health Sciences, Agricultural Sciences, Law, Management Sciences, and more.

At the undergraduate level, there are Bachelor of Arts (B.A.) programmes in English, French, Arabic and Islamic Studies, Bachelor of Science (B.Sc.) programmes in Computer Science, Mathematics, Biology, and Chemistry as well as Bachelor of Arts Education (B.A., Ed) in Early Childhood Education, English, French, and Primary Education. In Health Sciences, there are Bachelor of Science (B.Sc.) programmes in Nursing Science, Public Health, and Environmental Health Science, while in the Agricultural Sciences, there are Bachelor of Agriculture (B.Sc. Agric.) programmes in Agricultural Economics, Agro-Business, Agricultural Extension and Rural Development. Management Sciences and Social Sciences offer programmes in Bachelor of Science (B.Sc.) Accounting, Business Administration, Marketing, as well as Banking and Finance. The Law programme offers the Bachelor of Laws (LL.B) degree. At the postgraduate level, there are a wide array of Masters and Doctoral degrees, in various disciplines, cognate to the above listed undergraduate programmes. Beyond these, NOUN also offers a range of professional programs and certificate courses.

Conspicuously absent from this wide range of courses are courses that demand core psychomotor skills that require coordinated physical movements for which the brain's control of muscular actions is essential. Such tasks usually require precision, dexterity, timing, and sensory-motor coordination. Some of the fields of study that demand

such skills include medicine, engineering, athletics, performing arts, and technical trades. None of these or related courses are offered by NOUN at any level.

There are a range of courses that teach a spectrum of cognitive and psychomotor skills. For such courses, those that are skewed towards the cognitive end of the spectrum may do well with ODL while those that are skewed towards the psychomotor end of the spectrum may present as challenging to ODL. One way of dealing with courses that teach both cognitive and psychomotor skills is blended learning. Blended learning combines traditional face-to-face classroom methods with online educational technics, thereby integrating the strengths of both in-person and digital instruction to offer a more flexible, personalised, and interactive learning experience.
To facilitate blended learning, NOUN runs a network of more than 100 Study Centres distributed across Nigeria. With a zonal spread strategically designed to cover Nigeria's six geo-political zones, the Study Centres serve the purposes of distribution of course materials, hosting of practical sessions and examination, as well as providing other students' services.

Beyond the use of blended learning, technology is usually employed at various levels of virtuality to enhance the capacity of ODL to deliver training within the wide spectrum of cognitive and psychomotor skills. In this regard, NOUN has taken a major proactive step in developing technologies in support of ODL. The African Centre of Excellence on Technology Enhanced Learning (ACETEL) is a specialised academic and research centre in NOUN, designed to develop technologies for enhanced ODL. It was established in 2019 under the World Bank-funded Africa Centres of Excellence (ACE Impact) project with the core mandate of driving innovation and capacity building in digital education technologies, for the whole of West Africa. The centre engages in research and runs Master's and doctoral programmes in Artificial Intelligence, Cybersecurity and Management Information Systems. These are three areas of technology of prime importance for technology enhanced learning.

Artificial Intelligence plays a transformational role in Technology-Enhanced Learning (TEL) by enabling smarter, more adaptive, and efficient teaching and learning experiences, making it more personalised, scalable, interactive, and data-driven. For example, Virtual Reality (VR) enhances ODL significantly by creating immersive, interactive, and experimental learning environments. This offers the potential of overcoming some of the limitations of physical separation between learners, instructors, laboratory equipment and workshop tools. By integrating Virtual Reality with Artificial Intelligence, gamification offers rewards that serve to sustain the engagement of challenges in skills acquisition processes. Response to real-time and realistic haptic feed-back can generate and document learners' performances with psychomotor skills, monitor focus and hand-eye coordination, tracking progress, identifying weaknesses, and suggesting areas of necessary revisions.

With the heavy reliance of ODL on digital platforms for the delivery of instruction, storage of learner data, management of students' assessments, and general communication, there is a need for ensuring the security, privacy, and integrity of the digital systems and the information contained therein. These depend on the availability of high-quality personnel with requisite knowledge in both management information systems and cybersecurity.

Hence, these three ACETEL post-graduate programmes are deliberately designed to build a foundation for research in the development of technologies for enhancing learning as well as producing scholars to further such research. One of the ongoing research projects at the ACETEL is the development of a computer application that facilitates geolocation and effective supervision of students on industrial attachment, industrial training, teaching practice, internship, Students' Industrial Work Experience Scheme (SIWES), and practicum, wherever they may be in the world. Another ongoing project is the development of a virtual chemistry laboratory that can be used to practice the performance of chemistry experiments. These experiments are simulated in the virtual space of computer memory and displayed on the screens of common low-specification personal computers, making them easily affordable by the average student.

Various other relevant projects are ongoing at the ACETEL, some of them, students' projects in partial fulfilment of the award of master's or doctoral degrees.

A note-worthy practice at the ACETEL is the allocation of not only institutional academic supervisors, but also industry supervisors to students, even up to the doctoral level of study. This practice impacts, not only the quality of research produced, but also the quality of the produced researcher. With up to 45 years of personal experience in teaching engineering, taking industry practice and experience into classrooms in various Nigerian tertiary institutions, this investigator knows very well, how skills acquisition remains a confounding challenge in the Nigerian education system. Students leave universities with little or no practical skills. Employers have got used to beginning yet another programme of training for fresh graduates coming out of Nigerian universities. However, the palpable enthusiastic acceptance into the labour force of some of the ACETEL students on whose project this investigator served as the industry supervisor is gratifying. It is an eloquent testimony to the success of skills acquisition via ODL, using the ACETEL/NOUN approach, despite its acknowledged challenges.

Conclusion

The acquisition of knowledge and skills to convert Nigeria's teeming youth population into an asset, as valuable human resource, is paramount. As a pre-industrial developing nation, the acquisition of practical skills is a priority, and so, there should be national emphasis on turning existing knowledge into practical skills to feed Nigeria's development needs. The role NOUN is playing in complementing the efforts of Nigeria's 'brick and mortar' universities in filling Nigeria's skills gap is definitely significant.

The founding of NOUN has been clearly demonstrated by its results so far as a step in the right direction. It is addressing the issue of the youth bulge in Nigeria's demography, turning the large population of Nigerian youth into a national asset as a valuable human resource. The establishment of the ACETEL by NOUN is an eloquent demonstration of visionary leadership. The purposeful leadership at the ACETEL is

also a great credit to NOUN's visionary leadership that birthed and sustains the ACETEL. The teamwork attitude with which various departments in NOUN support the work of the ACETEL is noteworthy. These coalition of positives are bound to continue to make a significant impact on the acquisition of knowledge and skills for Nigerians in meeting national development needs. Efforts should be made to undertake a formal mapping of the long-term effects of ACETEL's proactive engagement of the challenges of psychomotor skills acquisition via ODL.

References

Adegbola, T. (2009). Indigenising Human Language Technology for National Development. Presented at the Africa Regional Centre for Information Science (ARCIS) Distinguished Guest Lecture 2009, University of Ibadan.

Burns, M., & Kretlow, T. (2007, February). The challenges associated with laboratory-based distance education. *EDUCAUSE Review*. Retrieved from https://er.educause.edu/articles/2007/2/the-challenges-associated-with-laboratorybased-distance-education

Che Maznah Mat Isa, W., Tahir, W., Oh, C. L., Noh, N., Chiew, F. H., Tukiar, M. A., & Mohd Noor, N. A. (2023). Enhancing teaching and learning of psychomotor skills in engineering laboratory courses during open and distance learning: An empirical study from Malaysian students' perspectives. *International Journal of Academic Research in Progressive Education and Development, 12*(1), 93–102. https://doi.org/10.6007/IJARPED/v12-i1/16113

Iwayemi, A. (2001) "Nigeria's Fractured Development: the Energy Connection". Inaugural Lecture, University of Ibadan.

Mayuze, N. M., Muizzah, N. N., Shahidah, S. S., Farina, N. M. H., & Asmani, D. M. Y. (2023). Performance of psychomotor skill in structural and material laboratory: A comparison of two teaching approach. *International Journal of Academic Research in Progressive Education and Development, 12*(1), 93–102. https://doi.org/10.6007/IJARPED/v12-i1/16112

Rahim, N. R. B. A., Darwis, N. Z. W. B. M., Asfar, J. B., & Noh, N. B. (2023). A comparison of psychomotor domain assessment in water engineering laboratory between F2F and ODL. *International Journal of Academic Research in Progressive Education and Development, 12*(1), 103–116. https://doi.org/10.6007/IJARPED/v12-i1/16114

Simpson, E. J. (1972). The Classification of Educational Objectives, Psychomotor Domain. Retrieved on 25 July 2022, from https://eric.ed.gov/?id=ED010368.

United Nations Population Fund. (2022). Country programme
        document for Nigeria: DP/FPA/CPD/NGA/9 (2023–2027).
        New   York: UNFPA.
        https://www.undp.org/sites/g/files/zskgke326/files/2023-
        01/Nigeria%20CPD%20-%202022.pdf