JOURNAL OF RESEARCH IN INDUSTRIAL TECHNOLOGY & EDUCATIONAL STUDIES (JRITES)
Homepage: http://Journals.unizik.edu.ng/index.php/jrites
e-ISSN 3122-0436
Vol 2 Issue 3 (2026) 50-57

Comparative Analysis of Behaviorism, Cognitivism, and Constructivism in Contemporary Teaching and Learning of Technical and Vocational Education in Yobe State, Nigeria

Ahmed Mohammed[1]*, Fatima Ayuba Aji[1], Abubakar Adam Adam[1], Baba Mohammed[1]

[1]*Department of Science Education, Yobe State University, Damaturu, Nigeria*

Corresponding author

Abstract: Technical and Vocational Education and Training (TVET) has become a strategic instrument for promoting sustainable economic growth, reducing unemployment, and equipping learners with practical competencies required for the twenty-first-century workforce. In Nigeria, particularly in Yobe State, improving the quality of TVET requires the adoption of effective instructional approaches that facilitate meaningful learning, critical thinking, and practical skill acquisition. This paper comparatively analyzes three dominant learning theories, behaviorism, cognitivism, and constructivism—and examines their relevance to contemporary teaching and learning in Technical and Vocational Education in Yobe State. The study explores the philosophical assumptions, instructional strategies, strengths, limitations, and practical implications of each theory within the context of competency-based vocational education. While behaviorism emphasizes observable behavioural changes through reinforcement and repetitive practice, cognitivism focuses on internal mental processes involved in acquiring, organizing, and retrieving knowledge. Constructivism, on the other hand, views learners as active participants who construct knowledge through interaction, collaboration, and authentic learning experiences. The paper argues that no single learning theory adequately addresses the diverse instructional needs of TVET. Rather, an integrated pedagogical approach that combines behavioural skill mastery, cognitive development, and learner-centred knowledge construction is most appropriate for enhancing teaching effectiveness and improving students' employability in Yobe State. The paper concludes by recommending continuous teacher professional development, curriculum innovation, improved instructional facilities, and policy support to facilitate the effective integration of these learning theories into contemporary TVET practice.

Keywords: Behaviorism, Cognitivism, Constructivism, Technical and Vocational Education, Teaching and Learning, Yobe State.

INTRODUCTION

Education remains one of the most significant drivers of national development because it equips individuals with the knowledge, skills, attitudes, and competencies required for productive participation in society. Among the various sectors of education, Technical and Vocational Education and Training (TVET) occupies a unique position because it emphasizes the acquisition of occupational competencies, technological innovation, entrepreneurship, and employability skills. In developing countries such as Nigeria, TVET has increasingly been recognized as a strategic mechanism for reducing unemployment, alleviating poverty, promoting industrialization, and fostering sustainable economic development (UNESCO, 2021).

The importance of TVET has become even more evident with the rapid advancement of technology, globalization, and the emergence of knowledge-based economies. These changes have transformed workplace expectations, requiring graduates to possess not only technical

Corresponding author: ahmadkhairunnass@gmail.com

competence but also critical thinking abilities, creativity, collaboration skills, adaptability, and lifelong learning capacities. Consequently, contemporary TVET institutions are expected to move beyond traditional teacher-centred instruction towards learner-centred pedagogies that encourage active participation, innovation, and problem-solving.

In Nigeria, the National Policy on Education recognizes Technical and Vocational Education as an essential component of national development by providing practical skills for self-reliance and economic productivity (Federal Republic of Nigeria [FRN], 2013). Despite this policy recognition, many TVET institutions continue to face significant challenges, including inadequate infrastructure, obsolete equipment, insufficient funding, limited teacher capacity, outdated instructional methods, and weak collaboration with industries. These challenges are particularly evident in many states of northern Nigeria, including Yobe State, where insecurity, socioeconomic constraints, and inadequate educational resources have affected the quality of technical education.

Yobe State has made considerable efforts to strengthen technical and vocational education through the establishment of technical colleges, vocational centres, and skills acquisition programmes. Nevertheless, achieving the desired learning outcomes requires more than the provision of facilities alone. The effectiveness of TVET also depends largely on the instructional approaches employed by teachers in facilitating students' learning experiences. Appropriate teaching strategies determine how learners acquire technical competencies, solve practical problems, retain knowledge, and transfer classroom learning to workplace environments.

Behaviorism, pioneered by scholars such as Watson, Pavlov, Thorndike, and Skinner, views learning as a measurable change in observable behaviour resulting from environmental stimuli and reinforcement. This perspective has significantly influenced competency-based education, practical demonstrations, repetitive drills, and performance-based assessments that are common within vocational education.

The growing complexity of vocational education suggests that reliance on a single learning theory may no longer be sufficient to address the diverse needs of learners. While behaviorism remains valuable for developing psychomotor competencies, cognitivism enhances conceptual understanding and decision-making, whereas constructivism promotes creativity, collaboration, innovation, and lifelong learning. Consequently, contemporary TVET requires instructional approaches that integrate the strengths of these theories to improve learning outcomes and workforce preparedness.

Against this background, this paper presents a comparative analysis of behaviorism, cognitivism, and constructivism within the context of contemporary teaching and learning in Technical and Vocational Education in Yobe State, Nigeria. The analysis seeks to identify the instructional contributions, similarities, differences, strengths, and limitations of each learning theory while proposing an integrated pedagogical framework capable of enhancing instructional effectiveness and improving students' technical competence.

Concept of Technical and Vocational Education and Training (TVET)

Technical and Vocational Education and Training (TVET) refers to organized educational programmes designed to equip individuals with practical knowledge, technical competencies, occupational skills, entrepreneurial abilities, and professional attitudes required for gainful employment and lifelong learning. Unlike general education, which primarily emphasizes theoretical knowledge, TVET integrates classroom instruction with practical experiences to prepare learners for specific occupations across industrial, agricultural, commercial, engineering, health, construction, and service sectors.

According to UNESCO (2021), TVET encompasses education, training, and skills development programmes that prepare individuals for employment while simultaneously promoting innovation, technological advancement, social inclusion, and sustainable development. Similarly, the International Labour Organization (ILO, 2022) views TVET as a mechanism for enhancing workforce productivity, reducing unemployment, and facilitating economic competitiveness through the development of competent human resources.

The National Policy on Education of Nigeria describes Technical and Vocational Education as a comprehensive educational process involving the acquisition of practical skills, scientific knowledge, attitudes, and competencies necessary for employment, self-reliance, and national development (FRN, 2013). This definition highlights the dual responsibility of TVET in producing both skilled employees and successful entrepreneurs capable of contributing to national economic growth.

In recent years, the philosophy of TVET has evolved significantly from focusing solely on manual skills acquisition towards the development of higher-order competencies such as critical thinking, digital literacy, innovation, communication, teamwork, and lifelong learning. Modern industries increasingly require workers who can adapt to technological changes, solve complex problems, and continuously upgrade their skills throughout their professional careers. Consequently, contemporary TVET institutions are expected to employ instructional approaches that encourage active participation, inquiry-based learning, collaboration, creativity, and experiential learning rather than relying exclusively on rote memorization or repetitive practice.

Within Yobe State, TVET plays an increasingly important role in addressing youth unemployment, poverty reduction, entrepreneurship development, and post-conflict socioeconomic recovery. Government-owned technical colleges, vocational centres, polytechnics, and skills acquisition programmes have continued to expand opportunities for technical education. However, the effectiveness of these institutions depends not only on the availability of workshops and instructional facilities but also on the pedagogical approaches adopted by instructors. Theoretical foundations such as behaviorism, cognitivism, and constructivism therefore provide valuable guidance for designing effective teaching and learning experiences that produce competent graduates capable of meeting contemporary labour market demands.

Behaviorism: Concept and Educational Foundations

Behaviorism is one of the earliest and most influential theories of learning in educational psychology. It views learning as a relatively permanent change in observable behaviour resulting from interactions between external stimuli and learners' responses. Behaviorists maintain that internal mental processes cannot be directly observed; therefore, instructional practice should focus on measurable behaviours that can be reinforced, modified, and evaluated objectively.

The development of behaviorism is associated with scholars such as Ivan Pavlov, Edward Thorndike, John B. Watson, and B. F. Skinner, whose work laid the foundation for stimulus– response learning, reinforcement, conditioning, and programmed instruction. Their contributions have had a lasting influence on skills training, competency-based assessment, and practical instruction, particularly within technical and vocational education. Behaviorism is based on the assumption that learning occurs when learners respond appropriately to environmental stimuli. According to Skinner (1953), behaviour is shaped and maintained through reinforcement, whereby desirable responses are strengthened by rewards while undesirable behaviours diminish through the absence of reinforcement or appropriate corrective measures. In educational settings, teachers play a dominant role by presenting

instructional stimuli, monitoring learner responses, providing immediate feedback, and evaluating performance against predetermined objectives.

Within Technical and Vocational Education and Training (TVET), behaviorism has considerable practical relevance because vocational education requires learners to master psychomotor skills through repeated practice, demonstration, and reinforcement. For instance, students learning welding, carpentry, automobile mechanics, electrical installation, or computer maintenance develop competence through continuous practice under the supervision of instructors. Repetition enhances accuracy, speed, and confidence while minimizing errors in practical tasks.

Behaviorist instructional strategies commonly applied in TVET include demonstrations, drilland-practice exercises, competency-based assessments, programmed instruction, simulation exercises, task analysis, and immediate performance feedback. These approaches enable learners to acquire standardized occupational skills that meet industry expectations. Despite its strengths, behaviorism has been criticized for emphasizing observable behaviour while giving limited attention to learners' thinking processes, creativity, motivation, and individual differences. Critics argue that vocational education in the twenty-first century requires learners not only to perform routine tasks but also to solve unfamiliar problems, innovate, and adapt to rapidly changing technologies. Consequently, behaviorism alone may not adequately prepare learners for the demands of contemporary workplaces.

Cognitivism: Concept and Educational Foundations

Cognitivism emerged during the mid-twentieth century as a response to the perceived limitations of behaviorism. Rather than focusing solely on observable behaviour, cognitivists argue that learning involves internal mental activities through which learners receive, organize, interpret, store, and retrieve information. Learning therefore depends on how knowledge is processed within the human mind. Major contributors to cognitivism include Jean Piaget, Jerome Bruner, David Ausubel, and Robert Gagné. Piaget's theory of cognitive development emphasizes that learners construct mental structures through assimilation and accommodation as they interact with their environment. Bruner advocates discovery learning, encouraging learners to explore concepts independently while teachers provide guidance. Ausubel emphasizes meaningful learning through connecting new information with existing knowledge, whereas Gagné proposes systematic instructional events that facilitate effective learning.

In TVET, cognitivism encourages teachers to organize learning experiences logically, beginning with simple concepts before progressing to more complex technical procedures. Instruction is designed to enhance learners' understanding of principles underlying practical activities rather than merely memorizing procedures. For example, before teaching students how to repair an electrical circuit, instructors explain concepts such as voltage, resistance, and current flow, enabling learners to understand why specific procedures are necessary.

Instructional strategies associated with cognitivism include concept mapping, problem-solving activities, guided discovery, advance organizers, reflective questioning, case studies, and multimedia instruction. These approaches promote deeper understanding, analytical thinking, and long-term retention of knowledge.

The major strength of cognitivism lies in its emphasis on meaningful learning, critical thinking, and intellectual development. Learners become capable of transferring knowledge to unfamiliar situations and solving complex occupational problems. However, critics observe that cognitivism may place greater emphasis on individual mental processes than on social interaction, collaboration, and authentic workplace experiences, which are essential elements of contemporary vocational education.

Constructivism: Concept and Educational Foundations

Constructivism represents one of the most influential learner-centred approaches in contemporary education. It proposes that knowledge is actively constructed by learners through interaction with their physical environment, previous experiences, peers, instructors, and society rather than being passively transmitted from teacher to student. The theoretical foundations of constructivism are largely associated with Jean Piaget, Lev Vygotsky, and John Dewey. Piaget emphasized individual cognitive construction through active exploration, whereas Vygotsky highlighted the importance of social interaction, language, and cultural influences in learning. His concept of the Zone of Proximal Development (ZPD) suggests that learners achieve higher levels of understanding when supported by more knowledgeable individuals through scaffolding. Dewey similarly advocated experiential learning in which education is grounded in meaningful real-life experiences.

Within TVET, constructivism encourages students to engage in authentic learning activities that resemble workplace situations. Learners participate in projects, collaborative assignments, industrial attachments, apprenticeships, problem-based learning, and practical experiments where they apply theoretical knowledge to solve real occupational challenges.
Teachers function primarily as facilitators who guide, mentor, motivate, and support learners rather than serving as the sole source of knowledge. Students are encouraged to ask questions, investigate solutions, collaborate with peers, evaluate alternatives, and reflect on their learning experiences.

Constructivist instructional methods commonly include project-based learning, inquiry-based learning, cooperative learning, collaborative problem-solving, experiential learning, simulations, and workplace-based learning. These approaches foster creativity, innovation, communication skills, teamwork, and lifelong learning competencies that are increasingly valued by modern industries. Nevertheless, constructivism is not without limitations. Successful implementation requires welltrained teachers, adequate instructional resources, smaller class sizes, sufficient instructional time, and supportive learning environments. In resource-constrained educational settings such as many public TVET institutions in Nigeria, implementing fully constructivist approaches may be challenging because of overcrowded classrooms, inadequate workshop facilities, and insufficient instructional materials.

Comparative Analysis of Behaviorism, Cognitivism, and Constructivism

Although behaviorism, cognitivism, and constructivism seek to explain how learning occurs, they differ considerably in their philosophical assumptions, instructional strategies, and educational implications. Behaviorism views learning primarily as behavioural change resulting from external reinforcement. The teacher directs learning activities while learners respond to stimuli through practice and repetition. Assessment focuses on observable performance and measurable outcomes.

Cognitivism, in contrast, views learning as a mental process involving perception, memory, reasoning, and problem-solving. Teachers organize instruction to facilitate understanding, while learners actively process information and develop cognitive structures. Assessment evaluates both knowledge acquisition and intellectual development.
Constructivism extends beyond both perspectives by emphasizing that learners actively construct knowledge through interaction with experiences, social environments, and authentic tasks. Teachers facilitate rather than direct learning, while assessment emphasizes project work, collaboration, reflective thinking, and practical problem-solving.

Despite these differences, the three theories complement one another within TVET. Behaviorism remains indispensable for developing technical accuracy and procedural

competence. Cognitivism supports conceptual understanding and decision-making, while constructivism prepares learners to apply knowledge creatively in dynamic workplace situations. Consequently, contemporary vocational education should avoid exclusive reliance on any single learning theory. Instead, instructional practice should integrate behavioural reinforcement for skill mastery, cognitive strategies for conceptual understanding, and constructivist approaches for innovation, collaboration, and lifelong learning.

Theoretical Framework

This paper is anchored on the complementary application of Behaviorist Theory, Cognitive Learning Theory, and Constructivist Learning Theory as a unified framework for improving teaching and learning in Technical and Vocational Education. Behaviorism provides the foundation for developing occupational competencies through reinforcement, repetitive practice, and performance assessment. Since many vocational skills require precision and procedural accuracy, behavioural principles remain relevant in workshop instruction and competency evaluation.

Cognitivism complements behaviorism by emphasizing learners' understanding of concepts, principles, and problem-solving strategies. Technical competence extends beyond performing practical tasks; learners must also understand the scientific and technological principles underpinning vocational activities. Cognitive instructional strategies therefore facilitate critical thinking, decision-making, and knowledge transfer. Constructivism further strengthens TVET by promoting learner-centred instruction, collaboration, innovation, and authentic learning experiences. Through project work, industrial attachment, simulations, and experiential learning, students develop higher-order competencies required for modern workplaces.

The integration of these theories provides a comprehensive pedagogical framework capable of addressing the cognitive, psychomotor, and affective domains of learning. Such an integrated approach is particularly relevant for TVET institutions in Yobe State, where improving graduate competence requires instructional strategies that combine technical skill acquisition, conceptual understanding, creativity, adaptability, and lifelong learning.

Comparative Analysis of Behaviorism, Cognitivism, and Constructivism in Contemporary Teaching and Learning of TVET in Yobe State, Nigeria

The effectiveness of Technical and Vocational Education and Training (TVET) depends largely on the instructional approaches adopted by teachers. Behaviorism, cognitivism, and constructivism each contribute uniquely to teaching and learning, but their suitability varies according to the learning objectives and instructional context. Behaviorism is most effective in teaching practical and psychomotor skills that require precision, repetition, and mastery. In TVET institutions in Yobe State, instructors frequently use demonstrations, supervised practice, and continuous feedback when teaching skills such as welding, electrical installation, tailoring, and automobile maintenance. These strategies ensure that learners acquire occupational competencies consistent with industry standards. However, overreliance on behaviorist methods may limit learners' creativity and independent thinking.

Cognitivism complements behaviorism by promoting conceptual understanding. Before learners perform practical tasks, they need to understand the scientific and technical principles underlying those tasks. For example, electrical installation students should understand circuit theory before wiring buildings. Similarly, agricultural students should understand soil science before crop production. Cognitive strategies therefore improve learners' ability to analyse problems, make informed decisions, and transfer knowledge to new situations.

Constructivism is particularly relevant to contemporary TVET because it encourages experiential and learner-centred education. Students learn more effectively when engaged in projects, collaborative tasks, industrial training, and real-life problem-solving activities. Such approaches develop innovation, communication, teamwork, and entrepreneurship, which are essential competencies for today's labour market.

Rather than viewing these theories as competing perspectives, contemporary TVET should integrate them. Practical demonstrations (behaviorism), conceptual explanation (cognitivism), and project-based learning (constructivism) should be combined to produce graduates who are technically competent, intellectually capable, and adaptable to workplace challenges.

Challenges Affecting the Application of Learning Theories in TVET in Yobe State

Despite the relevance of these learning theories, several factors hinder their effective implementation in Yobe State, including:

1. Inadequate workshop facilities and obsolete equipment.
2. Insufficient funding for technical education.
3. Limited professional development opportunities for TVET instructors.
4. Overcrowded classrooms and workshops.
5. Weak collaboration between educational institutions and industries.
6. Security and socio-economic challenges affecting educational activities.
7. Inadequate integration of digital technologies into teaching and learning.

These challenges reduce opportunities for learner-centred and practical instruction, thereby limiting the effectiveness of contemporary pedagogical approaches.

Conclusion

Behaviorism, cognitivism, and constructivism remain influential learning theories that continue to shape contemporary teaching and learning in Technical and Vocational Education. Each theory contributes distinct strengths to instructional practice: behaviorism supports skill acquisition through reinforcement, cognitivism enhances conceptual understanding and problemsolving, while constructivism promotes experiential learning, collaboration, and innovation.

For TVET institutions in Yobe State, no single theory sufficiently addresses the diverse learning needs of students. An integrated instructional approach that combines the strengths of all three theories offers the greatest potential for improving teaching effectiveness, enhancing students' employability, and supporting sustainable socio-economic development in the state.

REFERENCES

Ausubel, D. P. (1968). Educational psychology: A cognitive view. Holt, Rinehart & Winston.

Bruner, J. S. (1966). Toward a theory of instruction. Harvard University Press.

Federal Republic of Nigeria. (2013). National policy on education (6th ed.). Nigerian Educational Research and Development Council (NERDC).

Gagné, R. M. (1985). The conditions of learning (4th ed.). Holt, Rinehart & Winston.

International Labour Organization. (2022). Skills and lifelong learning for employability. International Labour Organization.

Pavlov, I. P. (1927). Conditioned reflexes. Oxford University Press.

Piaget, J. (1972). The psychology of the child. Basic Books.

Skinner, G. (2005). Connectivism: A learning theory for the digital age. International Journal of Instructional Technology and Distance Learning, 2(1), 3–10.

Skinner, B. F. (1953). Science and human behavior. Macmillan.

Thorndike, E. L. (1913). Educational psychology. Teachers College, Columbia University.

UNESCO. (2022). Strategy for Technical and Vocational Education and Training (TVET) 2022–2029. UNESCO.

UNESCO-UNEVOC. (2021). TVET country profile: Nigeria. UNESCO-UNEVOC.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.

Watson, J. B. (1913). Psychology as the behaviorist views it. Psychological Review, 20(2), 158–177.