

## Research Article

# Construct Validity of a Practical Guide on Practical Tasks and Activity Part List for Teaching Radio, Television and Electronics Works Trades in Nigerian Technical Colleges

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**Abstract**— The purpose of this study was to ascertain the construct validity of a practical guide intended to instruct students in radio, television, and electronics work regarding design processes and safety procedures. This study uses a quasi-experimental research design and the Successive Approximation Model (SAM) for research and development (R&D). In twenty (20) states, including the Federal Capital Territory (FCT) Abuja in Northern Nigeria, technical colleges providing radio television and electronics jobs were the sites of the study. The study's sample comprises 782 NTC1 students from fifteen carefully chosen technical colleges that provide RTVEW. 460 National Technical Certificate year one (NTC1) RTVEW students from 11 classes in 11 coeducational schools in Northern Nigeria's Education Zone made up the study's sample. Out of the fifteen coeducational Technical colleges in the Education Zone of Northern Nigeria, eleven coeducational schools were chosen using a simple random sample technique. A structured questionnaire on RTVEW with the title "Practical Guide for National Technical Certificate Students of RTVEW Questionnaire" (PGNTVCSRTEWQ) was the tool utilized to collect data for this study. On PGNTVCSRTEWQ, face and content validation were conducted. Twenty-seven specialists from the Department of Industrial Technology Education verified the instrument. Federal Technological University in Minna. In Nigeria, twenty-five (25) randomly selected technical college students offered RTVEW. The data was analyzed using I-CVIs, SCVI/UA, and S-CVI/Ave, and it was discovered that the content validity index at the third round of validation is 0.96. The practical guide for National Technical Certificate (NTC) students studying radio, television, and electronics works underwent a content validity analysis, and the results showed that the instrument met the requirements for a sufficient level of content validity. The comprehensive evaluation process, which included several rounds of expert reviews and the computation of numerous validity indices, led to this conclusion. The results show that, in spite of certain difficulties, the instrument is reliable and appropriate for use in teaching.

**Keywords**— radio, television, and electronic works; construct validity; practical guide; design processes; safety procedure

## 1. Introduction

Employability skill is a process that transfer skill needed by an individual to make them employable. Hence the skills are part of the highly demanding skills needed to be used in different places of work, in different nations of the world, different term are used to denote the concept of employability skills. Employers' individual and educational institution have been preoccupied with employability skills that can attract employers' attention that need to be developed by educational institutions through training. Hence, institution need to work collaboratively to chart a new course in parting young peoples with these employability skills [1]. [2] Maintained that different terms are used when referring to employability skill. Though sometimes they are used in different contexts but refer to the same thing. Such terms or concept are core or key skills, transferable skills, soft skills, graduate attribute, personnel skills and employability skills. For example, in the

United States is called basic skills, necessary skills or workplace know-how. In the United Kingdom it referred as core skill. The Australians call it key competencies, while New Zealand, it is referred to as essential skills [3]. According to [4]. Employability skills are the essential skill, personal qualities and value that enable you to thrive in any work place. [5], opined that employability skills are transferrable skill that is useful in nearly every job. They involve the development of an expertise, knowledge base or mindset that makes you more attractive to employer, especially in electronics work industries. In Nigeria. Perhaps, it is in this regards that scholars have advocating for TVET as panacea for unemployment and useful tool that can guarantee skills acquisitions toward self-reliance.

Any country, including Nigeria, can grow its technology, social structure, and economy on the basis of Technical and Vocational Education and Training, or TVET. Additionally,

TVET's primary purpose is to equip trainees with employability and workplace skills so they can pursue careers in fields that are higher than skilled crafts but still fall under the purview of science, engineering, or technology [6]. The socioeconomic development of the nation as a whole is greatly aided by TVET. The availability of skilled labor to carry out the multifaceted tasks required to keep industry turning is the only factor sustaining the expansion of the industrial sector. The Technical Education Department aims towards making available these trained technically qualified hands to serve the industry and society. [7] Also posited that TVET education is the training of technically-oriented personnel who are to be initiators, facilitators, and implementers of technological literacy that would lead to self-reliance and sustainability.. TVET is a method of preparing individuals for active participation in functionally valuable jobs and efficient sources of skilled labor, according to [8].claimed that the focus of TVET is on applied rather than academic, skills rather than knowledge, and practical rather than theoretical. In order to promote social mobility through lifelong learning, access, and equity as well as to eradicate unemployment for sustainable development, [10] recognized TVET as a strategy for the development of sustainable societies and economies. [11]. by enabling people, businesses, organizations, and communities to support equitable and sustainable economic growth, social justice, and environmental sustainability, demonstrate why TVET is essential for sustainable development.

In actuality, the industry has claimed [12] that the majority of job seekers must possess the information, abilities, and attitude necessary to secure employment, continue working, and generate fresh concepts that will boost an organization's output and spark the formation of new businesses. To ascertain the TVET service quality aspects in Nigeria and around the world, however, the evaluation of students' experiences is essential. The necessity to look into the quality of services provided by TVET providers based on students' experiences is justified by the recent complaints regarding the quantity and caliber of graduates in Nigeria [13]. This would help to improve Nigeria's socioeconomic development. Additionally, the college provided technical and vocational education and training (TVET), which encompasses polytechnic, monotechnic, and health technology colleges, college of agricultural, innovation enterprise institution [IEIs], vocational enterprise institution and technical colleges. [14].Moreover, technical colleges are also known as technical schools or institution that offer an education that prepare student for a specific trade [15]. The goal of technical colleges in Nigeria's educational system is to produce master craftsmen and skilled, independent, and enterprising craftsmen who can apply their technical knowledge and vocational skills to solve the country's industrial, agricultural, and economic problems [16]. The creation of technical institutions offering a variety of trades is one way the Nigerian government is working to accomplish these goals. radio television and electronics work [RTEW], building and bricklaying, metal fabrication, electrical installation, and automotive vehicle maintenance. One of the electrical and electronic engineering crafts offered in Nigerian technical

institutes is radio television and electronics works [RTEW], which gives graduates of these programs marketable skills. [17] Describe radio television and electronics work (RTEW) as one of the engineering crafts taught in technical colleges to generate middle-skill labor needed for the advancement of the country's economy and technology.

In particular, the RTEW modules are made to give students the fundamental skills they need to disassemble, assemble, repair, service, maintain, and install television sets, amplifiers, video recorders, and other electronic systems, appliances, and circuits [18]. The Nigerian Federal and State governments have acknowledged the value of radio television and electronics vocational education in technical colleges. As a result, numerous Federal and State Technical Colleges are introducing the curriculum [18]. [19] It has been noted that technical college students pursuing trades in electronics struggle to comprehend the concepts and procedures of the field, which hinders their performance in hands-on learning. In two distinct studies, educational scholars [20] and [21] found that while there are a number of knowledge acquisition patterns and propositions, the instructors who use conventional orthodoxy to disseminate knowledge are teacher-centered and non-practical-based, rather than task- and student-focused. In traditional orthodoxy, the tutor plays a big role, and students pay attention and observe in order to remember later.

Moreover, a coordinated and structured set of outwardly visible actions demonstrated during the course of completing a task. Using effective practice as a guide, the learner can acquire sound practical skills more easily. A practical handbook, often called a booklet, is typically a collection of instructions for a specific job given by someone who knows how to communicate that information to someone who needs it, such as someone using a computer, appliance, or car [21]. On the other hand, [22] believed that a Practical Guide is a document that describes how to utilize a product that enables someone to guide, organize, reinforce, and assess their own learning without the need for instructor guidance.

On the other hand, [23] noted that a practical guide's commonality is its status as a guidebook. They have been rebuilt with the intention of providing effective and meaningful guidance for learning practical radio, television, and electronics job skills, particularly with regard to practical tasks and part lists. This presents an opportunity for the development of a practical guide for RTEW students that can give program graduates an advantage over the plethora of job prospects that are emerging in the radio and television business. This is further supported by [24], who made hints that technical institutions and training facilities are increasingly need to alter their curricula in order to retain a strong technical workforce. Because practical guides are becoming more and more important in the job market and help with technical skill enhancement, it is essential that they be included in the RTVEW curriculum. This presents a chance for the development of a practical guide for RTEW students, which can give program graduates an advantage in the plethora of work prospects that are emerging in the radio

and television business. As a result, the study is related to the creation and testing of a practical manual that RTEW's NTC students will use to adopt the Addie model. This manual will go through five primary phases: analysis, design, development, implementation, and assessment. This indicates that self-directed learning of practical skills is necessary, as it hinders the comprehensive and step-by-step.

## 2. Related Work

The Construct Validity of a Practical Guide on Specific Practical Task and Activity Part List for Teaching Students of Radio, Television and Electronics Works Numerous research have looked into how skill assessment will improve students' performance across a range of subject areas. The radio and television skill assessment scale (RTSAS), which was created and validated in this study, will help assess students' abilities to identify and fix problems with radio and television systems. Two hypotheses were examined and one research topic was addressed in the study. Seven professionals created and verified the RTSAS, which consists of practical skills based on the National Business and Technical Examinations Board [NABTEB] curriculum and relevant literature. The RTSAS's item validation sample consisted of radio and television instructors from technical colleges in the South-South region of Nigeria. The RTSAS was then tested on radio and television students. One Way Analysis of Variance [ANOVA], Cronbach's Alpha, and statistical mean were used to analyze the data that were gathered. Six clusters and 76 practical skills were determined to be appropriate for the RTSAS, according to the study's findings. Additionally, it was discovered that the device had a high 0.95 dependability. Based on this outcome, it was suggested, among other things, that radio and television instructors in Nigerian technical colleges and other comparable establishments be trained to apply the RTSAS for performance evaluation in diagnosing and repairing radio and television faults.

[25] conducted research on the creation and validation of a psychomotor assessment tool for Federal Science and Technical Colleges in Nigeria to effectively evaluate practical skills in the electronics work trade. The study used an instrumentation research design for its investigation. 160 electronics trade teachers from 19 Federal Science and Technical Colleges [FSTC] in Nigeria made up the study's population. The research was directed by three research questions. The instrument used to collect the data was the Electronics Work Psychomotor Assessment Questionnaire [EWPAQ]. After the questionnaire's face and content were reviewed by three experts, the Cronbach Alpha technique was used to determine the questionnaire's reliability, and the results showed a reliability coefficient of 0.99. To answer the research questions, mean and standard deviation, factor analysis, Cronbach Alpha, and intra class correlation were used. The findings of the research showed that the developed Electronics Work Psychomotor Assessment Tool [EWPAT] measures what it is supposed to assess, is consistent, and exhibits an acceptable degree of inter rater agreement. The study suggests that the EWPAT be implemented in all FSTCs in Nigeria. This is because the EWPAT will help reduce the

inconsistent practices related to performance evaluation in the Electronics Work trade workshops and would also assist students in enhancing their practical performance.

[26] carried out research on the creation of e-modules covering fundamental electrical and electronic concepts. The goal of this project is to create a self-directed learning model-based electronic module that is Valid, Practical, and Effective. in order to support students' autonomous learning and comprehension of the fundamentals of electricity and electronics theory. The ADDIE instructional development approach is referred to in this research and development [R&D] study. The ADDIE development process consists of the following stages: analysis, design, development, implementation, and evaluation. According to research findings based on the evaluations of 82% media experts and 77% material expert validators, the created electronic modules are valid. According to responses from 84% of students and 83% of teachers, the electronic modules created have a high degree of practicality. By improving students' theoretical comprehension and evaluating the material's effectiveness, the results show that the approach is effective, as evidenced by the material's N-Gain value of 62%.

An electronics systems skill assessment scale (ESSAS), intended to improve the assessment of students' performance in the construction of simple electronics systems, was developed and validated in a related study conducted by [27]. The study was titled Development and Validation of Instrument for Assessing Practical Skills in Building Electronics Systems in Nigerian Technical Colleges. Two hypotheses were examined and one research topic was addressed in the study. The ESSAS was further tested on technical college students after being item validated using a sample of electronics teachers from technical colleges in the South-South region of Nigeria. Statistical mean, Cronbach's Alpha, t-test, and One Way Analysis of Variance [ANOVA] were used to examine the acquired data. It was recommended, among other things, that electronics teachers in technical colleges and other similar institutions in Nigeria be made aware of and use the ESSAS for assessing students' performance in construction of simple electronics systems. The study's results showed that 61 practical skills were found appropriate for the ESSAS. Additionally, the instrument was found to possess a high reliability of 0.87.

[28]. Conduct research on the creation of problem-based learning modules for basic electronics, as well as the response of educators and students to these modules. Additionally, note any improvements in the learning outcomes of students studying basic electronics. This study's approach to modeling ADDIE is based on research and development.[Development, Design, Implementation, Assessment]. This study focuses on 118 students and three teachers studying basic electronics at SMK Negeri 2 Pandeglang, namely in the first grade of the installation technique of electricity power. Moreover, information gathered from the test and questionnaire. The question form's test validity and reliability are assessed using the Pearson The correlation coefficient was 0.88, while the Cronbach's Alpha coefficient was 0.892. Based on problem-

solving, the basic electronics learning modules were developed and approved for use. The average validation result for material categories was found to be very decent, and the average validation result for media categories was also found to be very decent. In terms of readability, the modules fall into the very decent level, as does the learning curve. It is well known that the use of modules in the educational process is growing, as evidenced by the average student learning outcomes score of 68.53 rising to 80.24. T-test analysis results show that there has been a significant improvement in student learning outcomes, with calculate = 11.76 and table = 1.69.

[29]. Examine the Creation of Useful Study Guides for TV Broadcasting Management Programs. The goal of this project is to provide a comprehensive practical learning manual and learning medium that will facilitate students' completion of practical assignments while they attend online tutorials. This study uses a quantitative survey methodology. The expert's assessment of the guidebook's content validity and the descriptive analysis derived from the college students' questionnaire are used to evaluate the guidebook's and practical learning's quality. Three [three] experts in the field validated the data used in this study. In the meantime, 23 [twenty-three] college students participated in this study to rate the quality of handbooks and interactive learning materials. Three [three] experts in the field validated the data used in this study. In the meantime, 23 [twenty-three] college students participated in this study to rate the quality of handbooks and interactive learning materials. Two instruments were used in this study's data collection method for both expert and college student product assessments. Two approaches are employed in data analysis: (1) content validity and Aiken Formula verification; and (2) statistical description. The study's findings demonstrate that: 1] the guidebook quality and practical learning media assessment instrument has occupied valid criteria with an index Aiken score average of 0.76, placing the result in the medium category; and 2] the guidebook and practical learning media quality of television broadcasting management show a good result. The outcome of the descriptive analysis served as the foundation for this case. [30]. Conduct a study on the creation and verification of new closed-circuit television systems' contents for Nigerian technical colleges' satellite transmission and reception modules. For Nigerian technical colleges, the study created new closed-circuit television systems with satellite transmission and reception modules. A four-stage research and development research strategy was used in the study. From a population of 346, a sample of 228 was drawn using random and purposive sampling procedures. A structured questionnaire with a reliability rating of 0.83 was used to obtain the data. The t-test, standard deviation, and mean statistics were used to examine the data that was gathered from the respondents. The study found that new cognitive and psychomotor skills were needed for the installation and troubleshooting of satellite transmission and reception modules' closed-circuit television systems. These skills included, among other things, best practices for setting up and terminating procedures for display screens, applications of closed-circuit television systems, and

operational requirements for installing closed-circuit television. The study also showed that, when it came to the new cognitive and psychomotor abilities needed for the installation and troubleshooting of closed-circuit television systems, the mean replies of teachers and Electrical/Electronic Industrial staff did not differ significantly. In order to accommodate a more targeted skill development, it was suggested that NBTE take into consideration dividing the current satellite transmission and receiving module into four composite pieces, such as the installation and maintenance of closed-circuit television cameras.

[31] conduct a related study at Surabaya KAL-1 Vocational School on the Development of LED TV Learning Media in Audio Video Electronics Maintenance and Repair Subjects. In this study, the following objectives are set forth: [1] to characterize the quality of the LED TV trainer learning materials used in the Audio Electronics Maintenance and Repair courses at Surabaya KAL-1 Vocational School; [2] to characterize the reaction of the students studying Audio Video Engineering at Surabaya KAL-1 Vocational School; and [3] to examine the learning outcomes of the students studying Audio Video Engineering. There were four stages to this research: [1] preliminary investigation; [2] creating the LED TV trainer learning material; and [3] the final revisions and the empirical testing of the LED TV trainer learning media in Surabaya KAL-1 Vocational Audio Video Engineering class XII students, as well as the validation and revision of the media. The One Group Pretest-Posttest Design was used in the design of the empirical trial investigation. The t-test was utilized to examine variations in the average score of learning outcomes before and after they were taught utilizing LED TV trainers. The study discovered that: [1] the LED TV trainer learning media's validation results were deemed good/valid, meaning it is suitable for use as a learning medium, with an average score of 3.19, 3.88, and 3.69; [2] Average student learning outcomes scores before and after the use of LED TV trainer learning media differ; additionally, students' reactions to the use of LED TV trainer learning media were positive, with 84.4% of them responding in a positive manner.

The literature analysis revealed that no study to date had examined the validation of a practical guide for students pursuing national technical certificates in radio, television, and electronics in northern Nigeria. Thus, this work fills in this gap.

### 3. Research Hypothesis

The following null hypothesis was examined at the significance level of 0.05.

**HO1:** Regarding the impact of employing produced practical guides on the mean psychomotor achievement of students studying radio, television, and electronics, there is no discernible change].

### 4. Research Methodology

This study uses a quasi-experimental research design and the Successive Approximation Model (SAM) for research and development (R&D). The study was carried out in technical colleges in twenty [20] states, including the Federal Capital Territory (FCT) Abuja in Northern Nigeria, that offered courses in radio, television, and electronics. The study's sample comprises 782 NTC1 students from fifteen carefully chosen technical colleges that provide RTVEW. 460 National Technical Certificate year one [NTC1] RTVEW students from 11 classes in 11 coeducational schools in Northern Nigeria's Education Zone made up the study's sample. Of the fifteen coeducational Technical colleges in Northern Nigeria, Education Zone, eleven coeducational schools were chosen using a simple random sampling technique. The practical guide for National Technical certificate students of RTEW questionnaire [PGNTCSRTEW] was the name of the structured questionnaire on RTVEW that was employed as the data collection instrument for this study. On PGNTCSRTEWQ, face and content validation were both performed. Two experts from the Federal University of Technology, Minna's department of industrial technology education were among the 27 who verified the instrument. 25 randomly picked from technical college offering RTVEW. Using I-CVIs, SCVI/UA, and S-CVI/Ave, data was analyzed. After three rounds of validation, the content validity index was determined to be 0.96 as seen in Tables 1–5. Additionally, as Table 1-5 illustrates, the CVR of every item on the practical task dimension stayed substantially above the threshold, meaning that the panel of experts made no modifications to it.

### 5. Results and Discussion

The results and discussion of this research paper were presented independently as follows:

#### 5.1 Analysis of Results

The construct validity index and content validity ratio data analysis were used to present the study's findings, which were as follows:

**Table 1:** Calculation of I-CVI and S-CVI by two Approaches of S-CVI/UA and S-CVI/Ave for items of Practical Task Dimension

	Relevant Rating (5 or 4)	Not Relevant Rating (3, 2 or 1)	I-CVIs*	Interpretation
Item1	25	0	1	Appropriate
Item2	25	0	1	Appropriate
Item3	25	0	1	Appropriate
Item4	24	1	0.96	Appropriate
Item5	25	0	1	Appropriate
Item6	25	0	1	Appropriate
Item7	25	0	1	Appropriate
Item8	23	2	0.92	Appropriate
Item9	24	1	0.96	Appropriate
Item10	25	0	1	Appropriate
Item11	24	1	0.96	Appropriate
Item12	25	0	1	Appropriate
Item13	25	0	1	Appropriate
Item14	25	0	1	Appropriate
Item15	24	1	0.96	Appropriate
Item16	24	1	0.96	Appropriate

Number of items considered relevant by all the panelists=10, Number of terms=16, S-CVI/Ave\*\*\* or Average of I-CVIs=0.98, SCVI/UA\*\*=10/16=0.63.

NOTE: \* Item-Content Validity Items, \*\*Scale-Content Validity Item/Universal agreement, \*\*\*Scale-Content Validity Item/Average Number of experts=25, Interpretation of I-CVIs: If the I-CVI is higher than 79 percent, the item will be appropriate. If it is between 70 and 79 percent, it needs revision. If it is less than 70 percent, it is eliminated.

**Table 2:** Calculating of CVR for Practical Task Instrument items at the first round of judgment

	N <sub>e</sub> *	CVR**	Interpretation
Item1	25	1	Retained
Item2	25	1	Retained
Item3	25	1	Retained
Item4	24	0.92	Retained
Item5	25	1	Retained
Item6	25	1	Retained
Item7	25	1	Retained
Item8	23	0.84	Retained
Item9	24	0.92	Retained
Item10	25	1	Retained
Item11	24	0.92	Retained
Item12	25	1	Retained
Item13	25	1	Retained
Item14	25	1	Retained
Item15	24	0.92	Retained
Item16	24	0.92	Retained

NOTE: \* Number of experts evaluated the item suitable, \*\*CVR or Content Validity Ratio =  $[N_e - N/2] / [N/2]$  with 25 person at the expert panel  $[N=25]$ , the items with the CVR bigger than 0.49 remained at the instrument and the rest eliminated.

An expert panel consisting of two people was formed to make both quantitative and qualitative decisions regarding the instrument items in the second round of judgment, after the presentation of the 64 items to a panel of four experts for rating. Two requests for judgments on content validity ratio, content validity index, and instrument comprehensiveness were made to the panel members. They were asked to evaluate the instrument's face validity in each round as well. Tables 1 through 5 reflect the outcomes after analysis. It was determined what percentage of panel members agreed that the 64 items in the first round of judgment were clear and relevant. As shown in Table 2, the outcome demonstrated that every item on the practical task dimension of the instrument was deemed suitable, with an I-CVI rating ranging from 0.92 to 1 and an S-CVI rating of 0.63. Additionally, as Table 2 illustrates, all items on the practical task dimension were left unchanged by the panel of experts because their CVR remained significantly higher than the threshold.

As shown in Table 3, the I-CVI and S-CVI for the part list were also determined. Only five items—with an I-CVI ratio of 0.80 to 0.82—were determined to be appropriate for inclusion in the part list, and the remaining eleven [11] items require change based on their respective I-CVI ratios..

**Table 3:** Calculation of I-CVI and S-CVI by two Approaches of S-CVI/UA and S-CVI/Ave for items of Part List Dimension

	Relevant Rating (5 or 4)	Not Relevant Rating (3, 2 or 1)	I-CVIs*	Interpretation
Item17	19	6	0.76	Need Revision
Item18	19	6	0.76	Need Revision
Item19	19	6	0.76	Need Revision
Item20	19	6	0.76	Need Revision

Item21	20	5	0.80	Appropriate
Item22	19	6	0.76	Need Revision
Item23	19	6	0.76	Need Revision
Item24	19	6	0.76	Need Revision
Item25	21	4	0.84	Appropriate
Item26	19	6	0.76	Need Revision
Item27	20	5	0.80	Appropriate
Item28	20	5	0.80	Appropriate
Item29	20	5	0.80	Appropriate
Item30	19	6	0.76	Need Revision
Item31	19	6	0.76	Need Revision
Item32	19	6	0.76	Need Revision
				12.4

Number of items considered relevant by all the panelists=0, Number of terms=16, S-CVI/Ave\*\*\* or Average of I-CVIs=0.78, SCVI/UA\*\*=0/16=0

Based on CVR ratios, as displayed in Table 2 above, all elements in this dimension were kept. All of the products' contents, however, were changed to reflect the recommendations put out by the two experts' panel. A few of the recommendations include adding certain elements to the parts that require change. Resistors, a breadboard, jumper wires, variable resistors, and a semiconductor diode as an optional component are among the other parts. Safety goggles and other accessories were removed from some of the parts listed.

**Table 4:** Calculating of CVR for Part List instrument items at the first round of judgment

	N <sub>e</sub> *	CVR**	Interpretation
Item17	19	0.52	Retained
Item 18	19	0.52	Retained
Item19	19	0.52	Retained
Item20	19	0.52	Retained
Item21	20	0.6	Retained
Item22	19	0.52	Retained
Item23	19	0.52	Retained
Item24	19	0.52	Retained
Item25	21	0.68	Retained
Item26	19	0.52	Retained
Item27	20	0.6	Retained
Item28	20	0.6	Retained
Item29	20	0.6	Retained
Item30	19	0.52	Retained
Item31	19	0.52	Retained
Item32	19	0.52	Retained

NOTE: \* With 25 experts in the expert panel (N = 25), the number of experts who determined that the question was appropriate was \*\*CVR or Content Validity Ratio = [Ne-N/2]/[N/2]. Items with a CVR more than 0.49 were kept on the instrument, while the remaining items were deleted.

**Table 5:** Content Validity Index and total instrument at the third round of judgment

Dimensions of construct of the study	Number giving rating of (5 or 4)	I-CVIs	Interpretation
<b>D1: Practical Task</b>			
Item1	25	1	Appropriate
Item2	25	1	Appropriate
Item3	25	1	Appropriate
Item4	24	0.96	Appropriate
Item5	25	1	Appropriate
Item6	25	1	Appropriate
Item7	25	1	Appropriate
Item8	23	0.92	Appropriate
Item9	24	0.96	Appropriate
Item10	25	1	Appropriate
Item11	24	0.96	Appropriate
Item12	25	1	Appropriate
Item13	25	1	Appropriate
Item14	25	1	Appropriate
Item15	24	0.96	Appropriate
Item16	24	0.96	Appropriate

<b>D2: Part list</b>			
Item17	22	0.88	Appropriate
Item18	23	0.92	Appropriate
Item19	25	1	Appropriate
Item20	25	1	Appropriate
Item21	24	0.96	Appropriate
Item22	23	0.92	Appropriate
Item23	23	0.92	Appropriate
Item24	24	0.96	Appropriate
Item25	21	0.84	Appropriate
Item26	22	0.88	Appropriate
Item27	25	1	Appropriate
Item28	25	1	Appropriate
Item29	24	0.96	Appropriate
Item30	23	0.92	Appropriate
Item31	25	1	Appropriate
Item32	25	1	Appropriate
S-CVI/Ave=0.96			
S-CVI/UN=0.453			

### 5.2 Discussion of Findings

The instrument attained an acceptable degree of content validity, according to the content validity study conducted for the practical guide for National Technical Certificate [NTC] students in Radio, Television, and Electronics Works. The comprehensive evaluation process, which included several rounds of expert reviews and the computation of numerous validity indices, led to this conclusion. The results show that, in spite of certain difficulties, the instrument is reliable and appropriate for use in teaching. Using the conservative universal agreement technique, the scale content validity index [CVI] of the complete instrument was determined to be low. This approach makes it difficult to have a wide and diverse panel of experts agree on the validity of each item because it demands their consensus. Because there were two expert judges and twenty-five content validators on the panel in this study, it was challenging to reach a consensus decision. In this particular situation, the low CVI is indicative of the inherent difficulties in achieving a consensus among a large number of specialists with a wide range of experiences and opinions.

However, a notable strength of the study is the large number of topic experts that were participating. Although it makes reaching consensus more difficult, it guarantees a thorough assessment of the instrument from several perspectives. The panelists' varied areas of expertise provide a more complete and balanced evaluation of the instrument's content. Their combined efforts improve the guide's overall quality and applicability by assisting with the identification and correction of any possible flaws or gaps. Significantly, the scale-level content validity index [S-CVI] produced a high value of 0.96 when calculated using an average technique. When reaching a consensus is challenging, our approach averages the item-level CVIs to provide a more accommodating and accurate estimate of content validity. The high S-CVI denotes a high degree of consensus among the experts about the items in the instrument's relevance and intelligibility. It implies that the majority of the expert panel believes the instrument to be very valid, despite the difficulties in reaching universal agreement. This result was consistent with that of [32], who discovered that expert technologists possess a broad understanding of technology and are adept at making decisions regarding technical

concepts. Their experience also allows them to quickly and accurately assess different aspects of the technology design process, such as problem descriptions, prototypes, work plans, and independent completion times. Professionals in technology who are successful are very skilled at using their knowledge of technology design thinking principles and metacognitive abilities. We think that teaching preservice technology teachers about the technology design process will help them develop their engineering design thinking cognitive structure. To enhance their ability to think more deeply, preservice technology teachers' development in engineering-related courses could inform the design of these teaching courses. The study's conclusions are consistent with [33]. The content validity ratio (CVR) and content validity index (CVI) can be computed using Microsoft Excel: Overview The technical suitability of instruments must be determined and documented in research, assessment, and evaluation methodologies. It is crucial that these criteria are put to the test, evaluated, and understood by the people who are generating the evaluations, especially if they are "home-grown," or created by the organization.

The accreditation process is undoubtedly contentious, especially among faculty members. Faculty in higher education are assigned to several categories and are typically required to participate in teaching, scholarship, and service [34]. [35] discovered that faculty members may be reluctant to participate in the accrediting process because of philosophical disagreements over evaluation, their perceptions of the value of involvement, and the time commitment required. In order to support data quality, AAQEP and CAEP mandate that instrument validity be provided [36]; [37]. In many situations, content validity is the minimal acceptable validity type that needs to be reported [38]. It can be intimidating for faculty members who are not familiar with statistics or the testing procedure to test for content validity. There aren't many tools to help with the computations, so they can be laborious and time-consuming. It takes up time to manually enter numbers into a calculator's algorithms and start over when you make little mistakes. If such a program existed, it might be challenging to justify the funding for its purchase given the current budgetary challenges facing American higher education.

## 6. Conclusion and Future Scope

The purpose of the study was to ascertain the construct validity of a practical guide that included a list of tasks and activities for teaching radio, television, and electronics work trades at technical colleges in Nigeria. A content validity index and content validity ratio were used in cases where the practical guide for national technical certificate students of radio, television, and electronic works [PGNTCSRTEWQ] was used as a data collection tool. The results of the study demonstrated that improving students' performance in practical skills required the use of a practical guide for practical tasks and part lists. In this study, twenty-seven [27] instructors and lecturers who specialize in electronic works participated. The practical guidance had a considerable impact on the pupils' academic achievement, as evidenced by

the higher CVI 0.96 that the Twenty-seven [27] members of electronic experts' lecturers and teachers took part in the research. The higher CVI 0.96 that the rating group's validators earned when asked to choose items from the practical task and part list to include in the practical guide indicates that the practical guide had a significant impact on the student's academic development. Consequently, it was recommended that RTEW instructors use practical aids when teaching RTEWs.

Nevertheless, the current study only included NTC1 students from technical institutions; as a result, its findings cannot be generalized to other NTC student levels. It is suggested that more NTC students in technical colleges be the focus of next studies using this methodology. As per the study, students' skills can be effectively enhanced by using practical guides. Therefore, through introspection, a useful manual can aid in encouraging the active participation of student technologists and instructors in their educational endeavors, enabling them to acquire the knowledge and abilities required for enhanced output. To create a supportive learning atmosphere where student teachers' curiosity is successfully preserved and fostered, practical advice is essential. The study's findings therefore have the following implications for different educational levels. To increase awareness of various learning styles, teacher education programs should include a practical guide in their curricula. Teacher educators must make a real attempt to instruct students, teachers, and technologists in practice during a teaching session and to incorporate this into their regular practical teaching. All academic levels—including all practical courses—benefit greatly from using a guide. Consequently, training in must be provided to in-service teachers at all levels. Practical guides are utilized across a range of educational levels and have been crucial in introducing work experience and skill-building methods into workshop environments. Teachers could provide appropriate learning opportunities for pupils by using this practical guidance. Teachers benefit from developing their reflective teaching abilities and talents. Therefore, useful guiding techniques aid in understanding for both teachers and students.

In the direction of introducing workshop settings and methods of learning. Teachers and technologists can provide appropriate learning opportunities for students by using this practical advice. The development of reflective teaching practices and skill enhancement is advantageous for both educators and technologists. Therefore, in order to raise student performance, it is advised that Technical College Management support Electronic teachers in using the practical guide when instructing practical. To encourage student performance in radio, television, and electronic works, the National Board for Technical Education should provide workshops and seminars for technical college professors, especially those teaching electronics. These seminars should focus on how to use a guide effectively for teaching practical subjects. Teachers at Technical Colleges should learn how to create lessons utilizing practical guides, particularly for topics related to practicals. This is because practical guides still enable us as educators to place special

emphasis on psychomotor domains, which align with our own practical learning and teaching, provided that we guide our students through the entire cycle to improve their performance.

### Data Availability

This study concludes that there was an improvement on students' performance in practical skills required the use of a practical guide for practical tasks and part lists.

This study was limited to NTC I students offering Radio, Television and Electronic works in Northern Nigeria.

### Conflict of Interest

No conflict of interest.

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### Authors' Contributions

All authors reviewed and edited the manuscript and approved the final version of the manuscript.

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