WEAKNESSES AND SUCCESS STRATEGIES OF TOOLS/EQUIPMENT UTILIZATION IN VOCATIONAL/TECHNICAL INSTITUTIONS IN NIGERIA

BY

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ABSTRACT

The ultimate goal of teaching-learning process in vocational/technical education is to ensure that technical potentials, attitudes and skills are appropriately channeled by professionally qualified teachers to the students using tools/equipment as effective aids. This study identifies and examines the weaknesses and success strategies of *tools/equipment utilization in vocational/technical institutions in Nigeria. An instrument which comprised of 80 items entitled "Weaknesses and Success Strategies of Tools/Equipment Utilization in Vocational/Technical Institutions in Nigeria" (WSCTEUVTIN) was developed to evaluate 65 randomly selected public-owned technical institutions in Nigeria using professionally qualified technical/vocational teachers as respondents with mean, standard deviation, factor and correlation analyses used as analytical tools. These study findings revealed budgetary problems, obsolete machines/spares, internal disputes or conflicts, and insufficient programme planning duration were identified as major weaknesses while effective risk/uncertainties management plan, improved technical personnel capabilities and efficient orientation/standard compliance, transparent government commitment/support were equally identified as major success strategies necessary in the effective and efficient utilization of tools/equipment in technical institutions in Nigeria. The study further indicated significant correlations between variables which constitutes weaknesses and the success strategi*es of *tools/equipment utilization. The outcome of the study could be of significant value to stakeholders in education department/agencies/parastatals on concise modalities and approach of securing and utilizing sophisticated tools/equipment in technical/vocational workshops for the development skilled manpower nationwide.*

***Keywords*: Success strategies, tools/equipment utilization, vocational/technical education, vocational/technical teacher, weaknesses, Nigeria**

Introduction

In today's competitive environment where creativity and innovative potentials are speedily compelling developing economies to integrate the new concept of technological advancement in various vocations for sustainability involves the use of tools/equipment. Most technological institutions remain dilapidated, unconducive to learning, and without functional workshops. As direct consequence of these lapses in the educational and training system, the prospective labour-force is perceived to be inadequately equipped to the knowledge-driven, professionally unskilled and adaptive in practical perspective where the use of tools/equipment form an integral part. More so, the existence of poor attitude in the utilization of tools/equipment among teachers and other technical personnel are signals to the poor performance of students in examinations and the production of half-baked skilled manpower which culminates into the decay in Vocational/Technical Education (VTE) programmes. Conscious utilization of this tools/equipment helps the students in securing attention and making them willing and eager to learn, and thus may make learning pleasant towards the assimilation of things being taught.

One study by Ibe (1994) revealed that most of the necessary tools and equipment were lacking and that inadequate supply of workshop tools/equipment was responsible for student's poor performance in vocational/technical subjects. Uzoagulu (1992) however warned that where equipment and tools are not functional or adequately provided for technical training programmes, the students will suffer and will lead to the production of unskilled personnel/graduates that is unemployable and unproductive. In order to achieve the study objectives which is aimed at identifying the weaknesses and success strategies of tools/equipment utilization in technical institutions in Nigeria? This study identified and examined budgetary problems, personnel challenges, insufficient planning duration, internal disputes/conflict, and obsolete machines/spares as weaknesses. This study further identified and examined success strategies which include transparent government commitment/support, improved technical personnel capabilities, functional budgetary provisions, effective risk/uncertainties management plan, improve management methodologies/techniques, viable warrantee/guarantee protection, and as well as efficient orientation/standard compliance.

Weaknesses in the utilization of tools/equipment

The National Center for Research in Vocational Education (NCRVE, 1983) regarded items that are permanent or semi-permanent in nature which is expected to last more than three years as equipment. Tools/equipment utilization may be described as the process of bringing students to secure a first-hand-practical-exposure with either simple or complex resources to facilitate learning and training. Nwosu (1994) believed that people usually received experience through all their senses as they appealed to them. Beyond the application of the manipulative skills, tools/equipment utilization is packaged towards promoting timely learning and knowledge development, particularly in the manipulative applications. Current educational system has neglected the role of training the trainer to function efficiently in the utilization, maintenance and repairs (Iwuoha, 1993). Clearly and Iloyed (1992) emphasized that students handling of tools/equipment will provide the needed technical abilities in the real life-situation. Mbata (1990) crowned it all that schools and colleges lack adequate management strategies for effective

utilization of educational resource to improve the quality of teaching and learning. Skillful and intelligent handling of tools/equipment is necessary in achieving the overall objective of effective teacher-students relationships which constantly keeps failing and intended objectives of VTE not met.

The study reviewed literature on previous studies and also cross-cased fifteen (15) different Vocational/Technical Institutions in Nigeria using professionally qualified Vocational and Technical Teachers as respondents in securing information on the weaknesses and success strategies of tools/equipment utilization in vocational/technical institutions in Nigeria before it was administered randomly on 65 selected public-owned technical institutions in Nigeria which are not below Technical Colleges and above 10years of existence. Six (6) outstanding weaknesses of tools/equipment utilization identified through factor groupings were addressed below:

Budgetary problems

Budget refers to the total financial provisions packaged for the perfect execution of VTE programmes from the start to commissioning. Lots of projects crashed because of either misappropriation or misapplication of budgeted funds in the supply or purchase of tools/equipment. Functional budget is a strategic asset in academic programme which is required as essentials for viable aims to be achieved. Clearly, Hegazy and Ayed (1998) listed that the season, location, type of project, duration and programme scope had significant impact on individual programme costs. Additionally, budgetary constraints also occur due to unpredictable government tenure, including the prioritizing of needs and fund diversion.

Insufficient programme planning duration

It is rare for newly conceived vocational/technical programme to be trouble-free, even if when such academic programmes were successfully designed and tailored. Time allocated for programme are not managed efficiently to avoid delays and unnecessary spending. Aje, Odusami and Ogunsemi (2009) argued that the selection of competent personnel also boosts performance because these personnel are responsible for formulating and taking decision at the right time for VTE programme objectives to be met particularly the cost, time and quality. Additionally, most programme including VTE fails because of limited or restricted durations propagated by conditioned or non project specialists without exploring the details of the actual experimental/practical demands.

Obsolete machines/spare parts

Olaitan, Igbo, Onyemachi and Ekong (1999) described tools and machines as those portable and heavy instruments or devices for

performing special operations in vocational education especially in the training and learning situation. Nwachukwu (2010*)* described workshop facilities as all practical skill development resources that would facilitate the process of teaching, training, learning and evolution of vocational and technical skills. Regrettably, many of this equipment since their arrivals are not only uninstalled but are underutilized and uncared for (Uzoagulu, 1992).

Internal disputes/conflict

A major criticism facing the educational sector is the growing rate of delays in the programme delivery attributed to dispute and complaints existing among stakeholders. Kassab, Hegazy and Hipel (2010) maintained that conflict remain a challenge with the potential of leading to programme failures, litigation and outright abandonment. It is evident that most programmes prescribe appropriate dispute resolution or at times of conflicts do not offer the required remedy to damaged relationships among parties which further hinder both programme performance and success.

Personnel challenges

Education is both cost-intensive and investment which requires sufficient funding. Okoro (1993) stated that even though some of the teachers have basic qualifications the trend of new products characterized with intricate operating principles, teachers who may have been quite competent at the point of entry soon find that they need additional training. Sadly too, teachers who are expected to convert theory into practical for skill development and acquisition are challenged by either their negative mindset towards retraining and advancement in academic height or compromised entry mode which failed to scaled their professional and technical potentials. Additionally, McCaffer (1995) remarked that effective use of plant and equipment contributes to performance.

Success strategies in the utilization of tools/equipment

Success for a designed programme can be viewed as the degree to which programme expectations are fulfilled. Success strategies represent a paradigm of shift from "traditional and cultured" adaptation and application of teaching aids to a model that integrate creativity, innovation and hi-technology which involves the sequence of the flow of the activities. Achieving targeted goals requires a well-developed statement of objectives, usually in the form of activity schedule-list which serve as a control mechanism that provides measurable evidence. This study also identified seven (7) success strategies based on in-depth surveyed and interviews as discussed below:

Transparent government commitment/support

Some people in a given government departments/ministries develop negative attitude which cripples the functional activities in the educational sector. Notably, federal/state governments are sponsors and financiers of educational programmes who targets time, cost, quality needs rendered safely. In the management of VTE, governments have distinct objectives and functions

within different decision-making phases and are crucial in reshaping the nature and the expectation of the academic objectives which serves as the road map for VTE programme success. Russell and Skibineski (1988) stated that their involvement provides viable back-up to the programme objectives in areas of management, schedule, and resources control.

Improved technical personnel capabilities

The engagement of professionally unqualified vocational/technical teachers usually exerts negative influence on academic goals. In order to select the most academically and professionally qualified teacher appropriate for the academic programmes of VTE with the most realistic and accurate strategies, it is essential that the government agencies become acquainted with all the academic potentials, technical and general capabilities about the vocational/technical teachers as these professionals convert theoretical concepts to into practical skills. Recent technologies require versatile personnel who are vested with the technical capabilities on how to operate complex and intricate part of machines and not paper or qualification based teachers.

Functional budgetary provisions

The success of VTE programmes cost is not only confined to its budgetary sum but also include variations, modification cost and the cost created during facilities installations, staff training and re-training from inception to completion. During estimate preparation for intended VTE programmes implementation, attention should be directed to the priorities and its specific needs particularly tools/equipment by experts and professionals in VTE fields coupled with prompt release of funds. Udofia, Hadikusumo and Santoso (2015) mentioned that budget provides the mental power for project conception and development.

Effective risk/uncertainties management plan

Risks in educational programmes and VTE in particular are unseen and uncertainties which most often may also be notice lately and greatly influences cost of VTE programme installation, duration and the expected quality and standard of the TVE programme. Beyond the adherence to the installation and practical guides, prompt partnering involving the local technical staff of various government, her agencies with tools/equipment with the equipment manufacturers will drastically curtail risk/uncertainties. The risk management plan should not be limited to the formal documentation only but also utilized project checklists in designing a compatible risk model (Udofia et al., 2015).

Improve management methodologies/techniques

Non-utilization of the needed educational management methodologies have significantly contributed to a monumental economic loss in terms of loss of resources, fund, and time culminating into total programme failures with no concrete completion time in sight (Nwachukwu, Echeme and Okoli, 2010). Recent technologies are by their nature complex and sophisticated which involves different methodologies and hence effective educational

management methodologies and techniques complement the usage of tools/equipment in defining work packages in VTE.

Viable warranty/guarantee protection

Procurement involves the transfer of the design products, continuous management and its usage by the other parties who could better manage same (Gransberg, Koch and Molenaar, 2006). In choosing a delivery model suitable for imported machines, government must also consider the nature of the TVE programme, the uniqueness of the programme; technical qualifications of personnel required and its availability; financial implication, the level of warranty/guarantee provisions reached among others as major determinants. McDermott (1999) concluded that a viable procurement is the framework within which sound VTE programme is brought about**,** acquired or obtained..

Efficient orientations/standard compliance

The principle of quality compliance in the installation of effective and functional vocational/technical programme is controversial and greatly compromised by most programme sponsors and financiers based on their selfish motives other than mounting the trades. In combating these compounding challenges hindering VTE programmes, conformance to both quality orientation is necessary prior to programme installations and as well as the provisions of quality set of machines coupled with top management commitment in meeting VTE targeted goals.

Methodology

An instrument which comprised of 80 items, entitled "Weaknesses and Success Strategies of Tools/Equipment Utilization in Vocational/Technical Institutions in Nigeria (WSCTEUVTIN) was developed and aimed at evaluating the Weaknesses and Success Strategies of Tools/Equipment Utilization in Vocational/Technical Institutions of 65 randomly selected public-owned technical institutions in Nigeria which are not below Technical Colleges and above 10years of existence. This instrument was administered personally on 65 professionally qualified technical/vocational teachers who have been in the practice for more than 10years in Nigeria were chosen as respondents in order to obtained practical information. The study respondents were given adequate time span of three (3) months to fully understand the instrument before indicating their choices. This same number of questionnaire items was personally retrieved and analyzed, which represented a 100% response rate. Mean values and standard deviation for the variables were used as preliminary analysis to examine the items as weaknesses and success strategies, with a computed mean above 3.0 considered high enough for factor analysis based on a 5-point scale of strongly-agree to strongly-disagree used in this study. In this study, mean scores with standard deviation ranges from 3.078*±1.027 to 3.933**±1.958 were obtained for the weaknesses as shown in Table 1. These procedures were used in obtaining 25 variables of weaknesses from the initial 40 variables which are grouped in Tables 2.

Table 1: Mean values for weaknesses tools/equipment utilization

S/no	Variables	Mean	Remarks (High=H; Low= L)	Sd
1.	Wrong use of TVE budget by institutional administrators influence its cost	3.400	H	0.995
2.	Late procurement of materials/tools/machines by approved government agency/department influence total TVE cost	3.217	H	1.091
3.	Programme design changes influence TVE practical durations	2.637	L	0.857
4.	Workshop spacing seriously affects students participation in practical activities	2.509	L	0.818
5.	Failures in meeting standard/regulated dimensions and designs by the facilitators influence total TVE duration	3.215	H	0.926
6.	Faulty machine/tools installations influence the capabilities of students during practicals.	2.412	L	2.412
7.	Insufficient knowledge of the facilitators on facilities TVE influence installations	3.367	H	1.008
8.	Slow pace of teaching technical course by the teachers/personnel used in influence total TVE duration	3.033	H	1.134
9.	Use of advance engineering software influence TVE outcome	2.803	L	0.913
10.	High cost of financing expertise consultations/training /retraining of local staff influence total TVE duration	3.100	H	3.100
11.	High unreasonable demands by the teachers/personnel during practical activities affects total project/project duration	3.517	H	3.517
12.	Excessive variations or change orders by contractors during routine maintenance influence TVE goals	2.267	L	0.118
13.	Allocation of insufficient time for technical trades influence student skills development	3.400	H	0.960
14.	Allocation of insufficient time for technical trades influence student skills development	2.617	L	0.617
15.	Bureaucratic delays in payment to working materials influence TVE installations	3.500	H	0.873
16.	Mistakes and discrepancies in setting-out tools/machines by facilitators influence TVE goals	3.367	H	0.991
17.	Payment of financial gratifications/inducements influence TVE performance	2.547	L	0.887
18.	Failure to plan risk/uncertainties influenced timely implementation of TVE	3.667	H	1.144
19.	Inadequate supplies of consumable influence TVE	2.667	L	2.667

	performance			
20.	Complexities in machine design influence TVE objectives	2.083	L	0.963
21.	Insufficient knowledge of the teachers/personnel influence total TVE duration	3.097	H	0.861
22.	High-tech machines/tools often take longer time to understand the complexities characterized in their operations	3.417	H	0.962
23.	High inflation rates influence TVE funding	2.950	L	0.982
24.	Bureaucratic delays in payment to crew members influence TVE implementation	3.850	H	1.254
25.	Language of instructions of the operation manuals of tools/equipment are alien and it affect practical activities	2.533	L	1.049
26.	Use of out-dated machines/equipment/spares by the TVE facilitators culminate into extended duration	3.078	H	1.027
27.	Use of sub-standard materials by the teaching personnel influence TVE performance	2.867	L	0.921
28.	Conflicts between heads and teachers on timely release of practical materials affects total TVE duration	3.903	H	1.958
29.	Bureaucratic delays in the approval of funds for influence TVE budget	2.867	L	0.892
30.	Low number of qualified manpower influenced TVE performance	2.479	L	0.157
31.	High cost of practical materials acquisition by government agencies/departments influence total TVE duration	3.293	H	1.031
32.	Technical incompetency of the teachers/personnel in handling practical activities influence total TVE duration	3.467	H	1.729
33.	Insolvency of government department/agencies influence TVE performance	2.933	L	0.901
34.	Use of faulty machines and equipment during practical sessions by facilitators often result into time extension	3.367	H	1.008
35.	Inadequate teaching methods by the teachers/personnel handling technical courses influence total TVE duration	3.317	H	1.081
36.	Unstable economic situation influenced TVE success	2.900	L	0.831
37.	Payment of variations in the cost of labour and materials influence TVE cost	3.367	H	1.008
38.	Variations in the cost of acquiring foreign materials by government departments influence total TVE duration	3.897	H	1.202
39.	Bureaucratic delays in the release of project funds by government department/agencies weakens budget	3.149	H	0.951
40.	Inadequacies in understanding the designs and	3.183	H	0.823

	specifications by the facilitators influence total TVE duration			

Factor analysis of the weaknesses and success strategies of tools/equipment utilization

The Kaiser-Meyer-Oikun (KMO) of 0.856 and Bartlett's test values of 75.709 with corresponding significant levels of 0.035 obtained were all appropriate for the factor analysis of the weaknesses of tools/equipment utilization. From tables 2, the high communalities of 0.417 – 0.941 for the weaknesses of tools/equipment utilization indicated that the extracted components represented their variables well. In this study, the 25 variables of weaknesses shall be reduce into factors of five (5) groups each that summarized the essential information and characteristics using factor analysis which indicates an Eigen value of 81.67 with a cumulative variance of 88.37% using KMO as an index. Tables 2 below indicate the groupings for the variables which constitute weaknesses considered in this study.

Table.2: Factor groupings/group names for the weaknesses of tools/equipment utilization

S/no	Variables	Loadings	Group names
1.	Bureaucratic delays in the release of project funds by government department/agencies weakens budget (W039)	.941	Budgetary problems (W1)
2.	Wrong use of budget by institutional administrators influence TVE cost (W001)	.911	
3.	High cost of practical materials acquisition by government agencies/departments influence total TVE duration (W031)	.846	
4.	Payment of variations in the cost for labour and materials influence TVE cost (W037)	.821	
5.	Bureaucratic delays in the approval of funds influence TVE budget (W029)	.709	
6.	Late procurement of materials/tools/machines by approved government agency/department influence total TVE cost (W002)	.607	
7.	Bureaucratic delays in payment to crew members influence TVE implementation (W024)	.537	
8.	Bureaucratic delays in payment to working materials influence TVE installations (W015)	.519	
9.	High foreign exchange rate on the procurement of tools/machines influence total TVE duration (W039)	.417	
10.	Insufficient knowledge of the facilitators on facilities influence TVE installations (W007)	.954	Insufficient programme planning duration
11.	Inadequacies in understanding the designs and specifications by the facilitators influence total TVE	.920	

	duration (W040)		(W2)
12.	Waiting time for imported machines/tools influence TVE delivery date (W013)	.728	
13	High-tech machines/tools often take longer time to understand the complexities characterized in their operations (W022)	.556	
14.	Use of faulty machines and equipment during practical sessions by facilitators often result into time extension (W034)	.892	Obsolete machines/spares (W3)
15.	Use of out-dated machines/equipment/spares by the TVE facilitators culminate into extended duration (W026)	.418	
16.	Variations in the cost of acquiring foreign materials by government departments influence total TVE duration (W038)	.527	
17	Mistakes and discrepancies in setting-out tools/machines by facilitators influence TVE goals (W016)	.801	Internal disputes/conflicts (W4)
18.	Conflicts between heads and teachers on timely release of practical materials affects total TVE duration (W028)	.779	
19.	High unreasonable demands by the teachers/personnel during practical activities affects total TVE duration (W011)	.536	
20.	Failures in meeting standard/regulated dimensions and designs by the facilitators influence total TVE duration (W005)	.515	Personnel challenges (W5)
21.	Technical incompetency of the teachers/personnel in handling practical activities influence total TVE duration (W032)	.727	
22.	Slow pace of teaching technical courses by the teachers used in influence total TVE duration (W008)	.545	
23	Insufficient knowledge of the teachers/personnel influence total TVE duration (W021)	.518	
24.	Inadequate teaching methods by the teachers handling technical courses influence total TVE duration (W035)	.453	
25.	High cost of financing expertise consultations/training /retraining of local staff influence total TVE duration (W010)	.604	

Similarly, mean scores with standard deviation ranges from 3.017*±1.109 to 3.983*±0.892 were obtained for the success strategies as shown in Table 3. Additionally, 40 variables of success strategies were reduced to 25 variables which are grouped in Tables 4.

Table 3: Mean values for success strategies

S/no	Item	Mean	Remark (High=; Low=L)	Sd
1.	Outline the most applicable method of award/procedures of work execution to achieve targeted TVE objectives	3.367	H	0.991
2.	Installations of strong alliance in securing technical expertise on basic operations and replacement of default parts/tools/equipment	3.217	H	1.106
3.	Assess the value of the TVE programme needs	2.467	L	0.929
4.	Review tools/machines purchase agreement	2.100	L	1.046
5.	Assess the standard of workmanship in the TVE programme	2.950	L	0.946
6.	Develop checklists in-line with the scope of tools/machines involve in TVE	2.850	L	0.954
7.	Develop contingency plan for perceived weaknesses or risk/uncertainties	3.983	H	0.892
8.	Alignment of tools/equipment with details working drawings and specifications	3.433	H	0.945
9.	Outline the most applicable method of award/procedures of work execution to achieve targeted TVE objectives	3.267	H	1.087
10.	Assess measures on how to trouble-shoot faulty machines	2.783	L	0.993
11.	Outline specific method of delivery in-line with the TVE schedule/timetable	3.050	H	1.213
12.	Review lapses frequently discovered each operating hour	2.400	L	0.910
13.	Allocate relevant and adequate number of technical equipment/machineries to learners during	2.300	L	1.013
15.	Assess the financial strength and the cost implications of the TVE	3.875	H	0.964
14.	Allocate adequate time to fully enhance the TVE completion/ commissioning	2.800	L	0.971
16.	Revise crew technical qualifications of to integrate specific needs confronting TVE objectives	3.800	H	1.286
17.	Timely review fault(s) and complexities characterized in the machine/part design	3.483	H	0.892
18.	Adherence to Warranty provisions triggers installations	3.433	H	0.927

	of tools/equipment safe-keeping in promoting TVE programmes			
19.	Secure details of relevant information prior to the operations/commencement/installations of TVE	3.817	H	0.930
20.	Appraisal of local needs prior to purchase and installation tools/machines/equipment	2.917	L	1.094
21.	Compliance to TVE schedules/ milestones are necessary in developing teaching learning process	3.750	H	1.668
22.	Define suitable type/form of tender/conditions in line with the nature of the TVE	3.017	H	1.186
23.	Adequate review of TVE demand prior to tools/equipment selection	2.20	L	0.935
24.	Outline proven measures to identify and manage problems/ risk/uncertainties	3.901	H	1.096
25.	Outline the most applicable method of pricing/payment and conditions for tools/equipment in a given TVE	3.417	H	0.962
26.	A clear details of cost implications based and payment modalities	3.100	H	1.037
27.	Functional and valid terms of contract terms/conditions clearly document	3.300	H	0.869
28.	Adherences to tools/machines manual/procedures are precautionary measures for human and machines safety	3.707	H	1.095
29.	Match each scope of work or work schedules with relevant methods/techniques	3.317	H	1.000
30.	Consider crew specific performance/credential(s) of the to address complex and intricate part TVE demands	3.333	H	1.274
31.	Alignment of tools/equipment with details working drawings and specifications	3.167	H	1.044
32.	Timely and functional orientation exercise are prerequisite in technical/vocational related courses	3.017	H	1.109
33.	Engage technical crew based on in-depth understanding, versatility and creativity in given TVE	3.133	H	1.082
34.	Personnel training and retraining local staff to cope with TVE demands	2.283	L	0.940
35.	Use of safety and protective apparatus promotes TVE performance	2.700	L	1.109
36.	Secure fair knowledge of practical exposure in industry will promotes use of tools/machines	2.017	L	0.273
37.	Engage personnel with high qualification to handle practical activities	2.678	L	0.991
38	Ensure bill of quantities/cost estimate matches tools/equipment when placing order	3.633	H	1.340
39	Development a matching work-method based identified	3.233	H	1.110

	areas of deficiencies			
40.	Select resource person based on creative and innovative potentials	2.186	L	0.873

Factor analysis of the weaknesses and success strategies of tools/equipment utilization

Also for the success strategies, the KMO's of 0.813 and Bartlett's test values of 1712.336 with corresponding significant levels of 0.035 obtained were also appropriate for the factor analysis of the success strategies of tools/equipment utilization. In Tables 4 the high communalities of 0.403 – 0.954 for the success strategies of tools/equipment utilization indicated that the extracted components represented their variables well. In this study, the 25 variables of success strategies shall be reduce into factors of seven (7) groups each that summarized the essential information and characteristics using factor analysis which indicates an Eigen value of 76.02 with a cumulative variance of 87.37% as shown in Table 4.

Table 4. Factor groupings/group names for success strategies

S/no	Variables	Loadings	Group names
1.	Functional and valid terms of contract terms/conditions clearly document (SS027)	. 935	Transparent government commitment/support (SS1)
2.	A clear details of cost implications based and payment modalities (SS026)	.954	
3.	Outline specific method of delivery in-line with the TVE schedule/timetable (SS011)	.791	
4.	Revise crew technical qualifications of to integrate specific needs confronting TVE objectives (SS016)	.953	Improved technical personnel capabilities (SS2)
5.	Consider crew specific performance/credential(s) of the to address complex and intricate part TVE demands (SS30)	.931	
6.	Engage technical crew based on in-depth understanding, versatility and creativity in given TVE (SS033)	.801	
7.	Outline the most applicable method of award/procedures of work execution to achieve targeted TVE objectives (SS01)	.519	
8.	Ensure bill of quantities/cost estimate matches tools/equipment when placing order (SS038)	.930	Functional budgetary provisions (SS3)
9.	Define suitable type/form of tender/conditions in line with the nature of the TVE (SS022)	.607	
10.	Outline the most applicable method of award/procedures of work execution to	.569	

	achieve targeted TVE objectives (SS09)		
11.	Assess the financial strength and the cost implications of the TVE (SS015)	.954	
12.	Outline the most applicable method of pricing/payment and conditions for tools/equipment in a given TVE programme (SS025)	.728	
13.	Develop contingency plan for perceived weaknesses or risk/uncertainties (SS07)	.882	Effective risk/uncertainties management plan (SS4)
14.	Outline proven measures to identify and manage problems/ risk/uncertainties (SS024)	.578	
15.	Timely review fault(s) and complexities characterized in the machine/part design (SS017)	.433	
16.	Secure details of relevant information prior to the operations/commencement/installations of TVE (SS019)	.892	
17.	Development a matching work-method based identified areas of deficiencies (SS030)	.536	Improved management methodologies/techniques (SS5)
18.	Match each scope of work or work schedules with relevant methods/techniques (SS029)	.719	
19.	Alignment of tools/equipment with details working drawings and specifications (SS08)	.707	Viable warranty/guarantee protection (SS6)
20.	Detail knowledge of quality assurance/safety compliance provides practical measures on extending life-span of tools/equipment (SS031)	.545	
21.	Adherence to Warranty provisions triggers installations of tools/equipment safe-keeping in promoting TVE programmes. (SS018)	.438	
22.	Installations of strong alliance in securing technical expertise on basic operations and replacement of default parts/tools/equipment (SS02)	.453	
23.	Compliance to TVE schedules/ milestones are necessary in developing teaching learning process (SS21)	.846	Efficient orientation/standard compliance (SS7)
24.	timely and functional orientation exercise are prerequisite in technical/vocational	.437	

	related courses (SS032)		
25.	Adherences to tools/machines manual/procedures are precautionary measures for human and machines safety (SS028)	.417	

***Decision rule*:**

The weaknesses (Independent Variables, IV) with five (5) variables and the success strategies (Dependent Variables, DV) also comprised of seven (7) factors as used in this study respectively. To determine the statistical relevance of both the IV and the DV variables as used in this study and also to determine the correlations between the variables of weaknesses and success strategies of tools/equipment utilization through correlation analyses. The null hypothesis which states that there is no correlations between the variables of weaknesses and success strategies of tools/equipment utilization shall be rejected if the p-value is lower than the 0.05 significant level considered in this study and as shown in Table 5, while the alternative hypothesis shall be accepted which state that there is correlations between the variables of weaknesses and success strategies of tools/equipment utilization in technical institutions in Nigeria.

Results and discussion

To determine whether correlation exists, between the variables of weaknesses and success strategies of tools/equipment utilization in VTE, correlation analysis was used. The results of correlations of weakness (W1 – W5) with success strategies (SS1 – SS7) are presented on Table 5 below.

Table 5: Correlations analysis between Weakness (W) and Success Strategies (SS) factors

	SS1	**SS2**	**SS3**	**SS4**	**SS5**	**SS6**	**SS7**
W1	.419*	.398*	.224	.683*	.529*	.270	.601*
W2	.281	-.110	.805*	-.017	-.160	.203	.873*
W3	.561*	.092	.275	-.102	.655*	-.058	.609*
W4	.130	.547*	.035	.454*	.067	.541*	.045
W5	-.139	.586*	.-220	-.111	.188	.425*	.026

*Significant

Transparent government commitment/support (SS1): SS1 had significant correlations with budgetary problems (W1) and obsolete machines/spares (W3) while insufficient programme planning duration (W2) internal disputes/conflicts (W4) and personnel challenges (W5) were not significantly correlated. This significant correlation suggests that the variables of W1 and W3 are more sensitive in affecting *SS1* as success strategy. Russell and Skibineski (1988) advised that top management involvement provides viable back-up to the programme objectives in areas of management, schedule, and resources control.

Improved technical personnel capabilities (SS2): SS2 had significant correlations with budgetary problems (W1), internal disputes/conflicts (W4) and personnel challenges (W5) while insufficient programme planning duration (W2) and obsolete machines/spares (W3) were not significantly correlated. This significant correlation suggests that the variables of W1, W4 and W5 are more sensitive in affecting *SS2* as success strategy. Cheng (1995) pointed out that personnel should also possess a thorough understanding of practical concepts buildability through the utilization of appropriate procedures.
Functional budgetary provisions (SS3): had significant correlations with insufficient programme planning duration (W2) only while obsolete machines/spares (W3) while budgetary problems (W1), obsolete machines/spares (W3) internal disputes/conflicts (W4) personnel challenges (W5) were not significantly correlated. This significant correlation suggests that the variable of W2 is more sensitive in affecting *SS3* as success strategy. Functional budget provides the mental power for project conception and development (Udofia et al., 2015).

Effective risk/uncertainties management plan (SS4): SS4 had significant correlations with budgetary problems (W1) and internal disputes/conflicts (W4) only while insufficient programme planning duration (W2), obsolete machines/spares (W3) and personnel challenges (W5) were not significantly correlated. This significant correlation suggests that the variables of W1 and W4 are more sensitive in affecting *SS4* as success strategy. Globallly, issues involving risk has not been accorded adequate attention leading to many failed contracts through poor planning, poor budgeting, and poor resource management.

Improved management methodologies/techniques (SS5): SS5 had significant correlations with budgetary problems (W1) and obsolete machines/spares (W3) while budgetary problems (W1), insufficient programme planning duration (W2), internal disputes/conflicts (W4) and personnel challenges (W5) were not significantly correlated. This significant correlation suggests that the variables of W1 and W3 more sensitive in affecting *SS5* as success strategy. Effective educational management methodologies and techniques requires tools as complement capable of defining work packages towards the achievement of intended goals.
Viable warranty/guarantee protection (SS6): had significant correlations with internal disputes/conflicts (W4) and personnel challenges (W5) while budgetary problems (W1), insufficient programme planning duration (W2) and obsolete machines/spares (W3) were not significantly correlated. This significant correlation suggests that the variables of W4 and W5 are more sensitive in affecting *SS6* as success strategy. Procurement involves the transfer of finished products to another party based on demands. Viable procurement is the framework within which sound programme is brought about**,** acquired or obtained McDermott, 1999).
Efficient orientation/standard compliance (SS7): SS7 had significant correlations with budgetary problems (W1), insufficient programme planning duration (W2) and obsolete machines/spares (W3) while internal disputes/conflicts (W4) and personnel challenges (W5) were not significantly correlated. This significant correlation suggests that the variable of W1, W2 and W3 are more sensitive in affecting *SS7* as success strategy. Competence-based work standards

which directly influence both the government and TVE programmes characteristics should be adopted right from the top administrative management to the teaching personnel.

Conclusions

The educational system in Nigeria is no longer static but dynamically changing and speedily demanding the application of sophisticated tools/equipment. This study examined the weaknesses and success strategies of tools/equipment utilization in vocational/technical institutions in Nigeria

In the weaknesses perspective, other than the personnel challenges, budgetary problems, obsolete machines/spares, internal disputes/conflicts, and insufficient programme planning duration were identified and there could be regarded as major weaknesses. In the success strategies, findings shown that transparent government commitment/support had correlations with budgetary problems and obsolete machines/spares making it a success strategy; improved technical personnel capabilities is adopted as a success strategy based on the correlations with budgetary problems, internal disputes/conflicts and personnel challenges; functional budgetary provisions is classified as success strategy based on the correlations with insufficient programme planning duration; effective risk/uncertainties management plan correlated with budgetary problems and internal disputes/conflicts making it a success strategy; improved management methodologies/techniques showed correlations with budgetary problems and obsolete machines/spares and is adopted as success strategy; viable warranty/guarantee protection correlated with internal disputes/conflicts and personnel challenges and is regarded as success strategy; and efficient orientation/standard compliance correlated with budgetary problems, insufficient programme planning duration and obsolete machines/spares affirming it as success strategy.

This study clearly outlined effective risk/uncertainties management plan, improved technical personnel capabilities and efficient orientation/standard compliance, and transparent government commitment/support as major success strategies. These findings affirm and strengthen previous studies and also provide vital explanations on the identified factors in both the weaknesses and success strategies. These study findings revealed the existence of correlations between weaknesses and success strategies of tools/equipment utilization in vocational/technical institutions through correlation analysis, and the null hypothesis is accordingly rejected. This clearlyjustify the significant tools/equipment in the teaching of VTE programme.

Recommendations

Based on the identified weaknesses of tools/equipment utilsation addressed in this study, the following recommendations are:

- ✓ Effective funding of TVE programmes by the relevant government departments
- ✓ Efficient and transparent utilization of budgeted funds
- ✓ Allocation of sufficient time for practical activities by the government departments
- ✓ Update/supply of modern and sophisticated tools/equipment with their instructions written in the language of the user
- ✓ Emphasis more on personnel training and retraining programmes to boost the technical and professional capabilities

- ✓ Effective partnering with tools/equipment suppliers in order to clearly understand tools/equipment handling/service procedures for the realization of challenging needs
- ✓ Provision of functional workshops for practical activities by the government departments
- ✓ Revised orientations on standard compliance, potential risk guides and warranty protections and
- ✓ Review of management methodologies/techniques in teaching of vocational/technical subjects.

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