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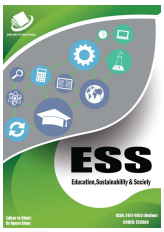

RESEARCH ARTICLE

ROLE OF BLENDED LEARNING IN AUTOMOBILE TECHNOLOGY PROGRAM IN NORTH-EASTERN NIGERIA

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ABSTRACT

Those essential Elements for automobile technology education program was born out of the need to bridge the gap between the theory and practical knowledge specifically in Nigeria. This study aimed at Exploring essential elements and one fundamental components of blended learning that are suitable for integration in automobile technology program at tertiary institutions in Nigeria. The study also develops a Blended Learning Model for teaching and learning by exploring those essential elements for technology education with a view to improving the teaching and learning. Quantitative research method was employed, so as to find the opinion of both teachers and students. The population of this research comprised of 571 respondents and the sample size was 346 respondents of Automobile Technology Education in the public tertiary institutions offering Automobile Technology Education in the North Eastern Nigeria. The model was tested via Sequential Equation Modelling (SEM) illustrated with a good goodness of fit from the factor loadings shown by the initial and final measurement model and indicating regression weights of the revised model. The findings can be useful in identifying dangers and benefits of using those essential elements technology mediated learning tools, While Online instruction as a fundamental component for blended learning presents new opportunities for teaching and learning and enhances social connectedness in teaching and learning of automobile technology. This demonstrate the appropriateness of adaptation those essential elements for professional development which can provide practical, accessible means for a wide range of issues which is relevant and effective continuing education.

KEYWORDS

Online Construction, Automobile, Nigeria

1. INTRODUCTION

Blended learning has been defined as a way to provide opportunities in a number of ways by a number of people but the common definition has always been unclear [1,2]. In essence, blended learning does not involve blending the educational objectives such as cognitive, psychomotor and affective domains, but rather it means the blending of online teaching approach with the face to face teaching in school setting. To this end, in experience of mixed learning, there found only few studies that have evidences of the ways how student approach towards learning technology may fluctuate qualitatively: few adopt approaches towards technologies without looking at the educational objective and utilize them to deepen and broaden their understandings of subject matters they study, whereas others adopt surface approach towards technologies as well as try to limit their use of technology without considering the objectives [3].

2. BACKGROUND

Developing an effective teaching and learning practice within a tertiary education segment is becoming an arena of growing concerns in general as tertiary institutions are concerned to be perceived as offering excellent learning and teaching experiences. Technical and Vocational Education and Training TVET in particular in Nigeria is believed to be one of the main priorities that greatly contributes to the socio-economic development of the country. Despite that, TVET is bedeviled with the shortage of qualified manpower especially in technical disciplines [4]. To address this issue of qualified manpower shortage, there is a need to introduce other means of training beyond face-to face instruction at tertiary level [5]. Moreover, suggestions for reform in higher education have something in common with secondary while secondary schools are concerned with quality of teaching and workplace. However, the tertiary institutions are mainly concerned on curriculum rather than on instructions. This means there has been little or no attention on how to improve learning process in their own classrooms. This also implied more attention is shifted to curriculum little or no attention is given to the process of teaching.

3. PROBLEM

Technical and Vocational Education and Training TVET in Nigeria is believed to be one of the main priorities that greatly contributes to the socio-economic development of the country, despite that, TVET is bedeviled with the shortage of qualified manpower especially in technical disciplines. To this end, in order to address the problem, there is a need to introduce another means of training TVET that is beyond traditional form of instruction especially at tertiary level to improve the quality of teaching and learning. In line with this improvement, it is sufficient to note that efforts to improve the quality of instruction in institutions are similar while secondary schools' emphasis is on what to teach, tertiary institutions concerned on the quality of curriculum and workplace, rather than on types of instructions. That is to say emphasis has been on what is taught more than how it is taught [6]. This means that there has been little or no attention on how to improve learning in their own classrooms via computer information technology in this global age. Generally, when we talk on teaching and learning, hardly can we talk on teaching for learning.

4. OBJECTIVE OF THE STUDY

The purpose and of this research are to develop a Blended learning Model for integrating blended learning in automobile technology at tertiary institutions in Nigeria. This research was carried out to develop a Model by identifying the essential element and fundamental component suitable for integration in to blended learning with a view to address skilled manpower shortage in the sector. Specifically, the objective of this study is to:

Identifying the significant areas of essential elements of blended learning which are suitable for integration in automobile technology programme at tertiary institutions in Nigeria.

The Objective one and RQ 1 was answered based on the 6 essential elements and one fundamental components of blended learning that are suitable for integration in automobile technology program at tertiary institutions in Nigeria. To this end, the sub-sections below present the perception of the respondents on the items measuring the 7 factors under study. It is a descriptive analysis of the items so as to easily understand the level of their agreement or disagreement with the items measuring blended learning in automobile technology program at tertiary institutions in North-Eastern Nigeria. The six element under study are: technology element measured using five questionnaire items; online component measured using twelve items; teaching and learning element measured using five items; professional development measured using ten items; content element measured using six items; operation element measured using five items; leadership element measured using six items; and learning outcome measured using four items. Five-point Likert Scale (5 = strongly agree, 4 = agree, 3 = undecided, 2 = disagree, 1 = strongly disagree) was used in measuring the items on the questionnaire.

5. TEACHING AND LEARNING ELEMENT

Results of the analysis as presented in Table 1 indicates that teaching and learning element has achieved a grand mean value of 4.28 with a standard deviation of .871. The respondents indicated a high level of agreement to the five items used in measuring teaching and learning element the result also showed that for the group of 571 respondents, the elements of teaching and learning had mean value (M= 4.28, SD = 0.871). Specifically, in this element, the mean score and standard deviation of TLE-2 were highest at 4.38 and 0.782, followed by TLE-1 of 4.33 and .745, TLE-5 of 4.30 and 0.925, TLE-4 of 4.24 and 0.723 while for TLE-3 the least mean score and standard deviation of 4.16 and 0.980 were arrived at. This signifies that the element TLE shave generally been accepted as indicated by TLE of mean 4. 16 to 4. 38, respectively.

These values of mean and standard deviation for TLE implied that the current educational changes happening in higher education is as a result of need to obtain better value for money, improved accountability through the imposition of a range of quality-control mechanism among which is a teaching and learning styles as teaching and learning in higher education has shifted to the center stage in the wider arena of educational reform. This is because innovation has come to byword for this reason there is a growing movement towards radical change in the ways in which knowledge skills and affection are passed on to students. This result is in agreement with the opinion of [7].

5.1 Research Method

This study is a quantitative case study in nature as it seeks the responds of both staff and students on the items measuring professional development construct which is in line with The No Child Left Behind Act, formal definition of what constitutes high-quality professional development and requires schools to report the percentage of their teaching faculty that meet the law's definition of a "highly qualified teacher" [8]. The law maintains that professional development should take the form of a "comprehensive, sustained, and intensive approach to improve teachers' and other educators' effectiveness in raising student achievement, through professional development approach [9,10].

Using sequential equation modeling (SEM) the study was analyzed by Confirmatory factor analysis to determine the factor loading. The measurement model has shown a good goodness of fit as indicated in the figure below.

Table 1: Significant Areas of Teaching and Learning Element

	Item	Mean	Standard Deviation
	Teaching and Learning Element	**4.28**	**0.871**
TLE_1	Teaching and learning using technological tools that are either web-based enhance blended teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.33	0.745
TLE_2	Teaching and learning is the fastest means of knowledge and skill transfer from the teacher to the student	4.38	0.782
TLE_3	Traditional or face-to-face instructional environments enhances active teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.16	0.980
TLE_4	Face to face teaching and learning activities is the most effective means of knowledge attainment in teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.24	0.923
TLE_5	Face to face teaching and learning enhances a permanent change in the students' behaviors during skill acquisition of automobile technology in our tertiary institutions in Nigeria	4.30	0.925

N=571

5.2 Technology Element

The results of the analysis presented in Table 2 indicated that technology element (TE) has achieved a grand mean value of 4.07 and standard deviation of .890 The results also showed that for the group of 571 respondents, as shown in Table 4.2 The results of the analysis TE-1 indicates that it had the highest mean value of (M=4.25, and standard deviation of 0.773. TE-5 has (M= 4.11 and standard deviation of .866. TE-2 and TE -3 have their mean values of (M= 4.05 each and standard deviation of .825 and .964) respectively while the least response had mean values of (M=3.91) and standard deviation of 1.022 with the measuring items. All the five items measuring technology element have a high mean value of above 4.0, except for 'demand for research, service and teaching influence' which has a mean of 3.91; thereby indicating a lower level of agreement of the respondents with the items.

Table 2: Significant Areas of Technology Element

	Item	Mean	Standard Deviation
	Technology Element	**4.07**	**0.890**
TE_1	Level of technology integration enhances blended learning and teaching of automobile technology program in tertiary institutions in Nigeria	4.25	0.773
TE_2	Technology work-related roadway crash prevention enhance blended learning integration in teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.05	0.825
TE_3	Inefficient time for developing technology-driven pedagogical activities affects blended learning and teaching approach for automobile technology in our tertiary institutions in Nigeria	4.05	0.964
TE_4	Faculties demand research, service and teaching influence qualities of instruction in teaching and learning of automobile technology in our tertiary institutions in Nigeria	3.91	1.022
TE_5	Effective creation and integration of technology improves blended learning approach in teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.11	0.866

N = 571

5.3 Content Element

Content element (CE) was measured using six measuring items on the questionnaire. Result of the analysis presented in table 4.3 had a grand mean of 4.08 and a standard deviation of .943, The result also showed that the Research group of 571 respondents presented the following result, CE-4 had a (M=4.18) and a standard deviation of .910, CE-6 had a (M=4.16) and a standard deviation of .881,CE-3 had a(M-4.14 and a standard deviation of .880, CE-1 had also a (M=4.09) and standard deviation of .995, CE-5 had a (M=4.02) and a standard deviation of .985, while the least response was on CE-2 which a (M=3.90) and standard deviation of 1.004 It has a mean indicated their agreement with the five indicators measuring content element. From the results, CE_2 'interactivity blended learning content for automobile technology' performed low when compared tothe rest of the five items. a score of 4.09 and a standard deviation of .943 as in table 4.3 below. The response on the content element is unanimous on their need to include it in their framework.

Table 3: Significant Areas of Content Element

	Item	Mean	Standard Deviation
	Content Element	**4.08**	**0.943**
CE_1	Competency-driven blended teaching and learning content enhances teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.09	0.995
CE_2	Interactivity blended learning content for automobile technology enhances learning in our institutions	3.90	1.004
CE_3	Attitude driven learning content for automobile technology enhances blended learning in our institutions	4.14	0.880
CE_4	Using the expert system for automobile technology enhances blended learning in our tertiary institutions	4.18	0.910
CE_5	Web-distributed blended learning content educational systems enhance learning for automobile instruction in our institution	4.02	0.985
CE_6	Collaborative blended learning content for automobile technology enhances learning in our institutions	4.16	0.881

5.4 Operation Element

Similarly, findings of the study on operation element reveal that the factor has a grand mean value of (M 4.07) and a standard deviation of .931 as presented in Table 4. The result also shows that OPE-2 (M=4.30) and standard deviation of .818, OPE -4 (4.20) and standard deviation of .919, OPE-1 had a Mean value of 4.07 and a standard deviation of .929, OPE-5 had a Mean 3.89, and standard deviation .973, while OPE-3 had a Mean of 3.86 and standard deviation of 1.015 Respondents tend to indicate high level of agreement with the five items measuring operation element. This is despite a low agreement with OPE_3 'operations involving face to face and online technology enhance teaching and learning of automobile technology' and OPE_5 'operation that involved audio and visual aids enhances blended teaching and learning of automobile technology' compared to the rest of the items.

Table 4: Significant Areas of Operation Element

	Item	Mean	Standard Deviation
	Operation Element	**4.07**	**0.931**
OPE_1	Operation of blended learning to promote engagement of teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.08	0.929
OPE_2	Operations creating new skills through blended knowledge sharing in automobile technology in our institutions enhances learning	4.30	0.818
OPE_3	Operations involving face to face (f2f) and online technology enhance teaching and learning of automobile technology in our tertiary institutions in Nigeria	3.86	1.015
OPE_4	Operations that tends to be less "foolproof" than a disruptive innovation during blended learning enhances learning in our institutions	4.20	0.919
OPE_5	An operation that involved audio and visual aids enhances blended teaching and learning of automobile technology in our tertiary institutions in Nigeria	3.89	0.973

N=571

5.5 Professional Development Element

Professional development is a factor used in determining blended learning in the study has a grand mean of 3.41 and a standard deviation of .950 as shown in Table 5. The result from the study indicates that PD-5 had a M=4.20 and standard deviation of .821. PD-1 had a mean of 4.15, and standard deviation of .967, PD-6 had M=4.12 and standard deviation of .899. PD-4 had Mean=4.10, and a standard deviation of .971, PD-3 had also Mean=4.07 and standard deviation of .915, PD-7 also had Mean=4.01, the standard deviation of 1.014. PD-9 had Mean=3.99, and standard deviation of .943, while PD-2, PD-8, PD-2, and PD-10 has Means=1.96,1.90,1.57 and standard deviation of 1.014,1.034, and 1.570 respectively.

This element having measured using ten items on the questionnaire with a grand mean score of 3.41 and a standard deviation of .950 as shown in Table 5 below tend to show high level of agreement with all the items PD except for PD-2,8 and 10 ability to teach others using technology enhances blended learning of automobile technology', PD -8 'involvement of resources expert around the country enhances professional development for blended teaching and learning of automobile technology' and PD-10 'flexibility of instructional method for teachers and students which enhances blended teaching and learning of automobile technology' which have a very low mean score of below the average of 2.5.

It can be deduced from the findings that; the teachers need to be professionally developed to enable them to perform their job effectively and remain current on their job.

Table 1: Significant Areas of Professional Development

	Item	Mean	Standard Deviation
	Professional Development	**3.41**	**0.950**
PD_1	Technological advancements for blended learning enhance professional development in teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.15	0.976
PD_2	The ability to teach others using technology enhances the blended learning of automobile technology in our tertiary institutions in Nigeria	1.90	1.034
PD_3	Expansion of skills that would make life meaningful enhances professional development in teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.07	0.915
PD_4	The growth in the use of information technologies enhances professional development for blended teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.10	0.971
PD_5	Striving to accelerate institutional improvement in teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.20	0.821
PD_6	Practices fostering each students' unique potential enhances professional development in teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.12	0.899
PD_7	The blend of traditional teacher education enhances professional development in teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.01	1.014
PD_8	Involvement of resources expert around the country enhances professional development for blended teaching and learning of automobile technology in our tertiary institutions in Nigeria	1.96	1.047
PD_9	Varieties of learning opportunities to students enhance professional development for blended teaching and learning of automobile technology in our tertiary institutions in Nigeria	3.99	0.943
PD_10	The flexibility of instructional method for teachers and students with enhances blended teaching and learning of automobile technology in our tertiary institutions in Nigeria	1.57	0.875

N=571

5.5 Leadership Element

Leadership as an element in blended learning framework had a significant role in the framework for the study as the response had a grand Mean=4.06 and standard deviation of 1.003. Furthermore, results of the analysis of leadership element reveal that leadership element which a factor in determining blended learning framework has achieved is an LE-5 Mean =4.31, and a standard deviation of .895, while an LE-1and2 with Mean= 4.04each standard deviation of .957and 1.040 are presented. As presented by a research group of 571 respondents.

Similarly, the analysis presented a result of mean and standard deviation as shown in Table 4.6 below. From the findings, respondents have indicated a high level of agreement with the six items measuring leadership element. However, LE_3 Mean=3.96 and standard deviation 1.002, LE-4 Mean=3.95, standard deviation .999 'Leadership training enhance blended teaching and learning of automobile technology' have obtained less level of agreement compared to the rest of the four items provide the needed leadership and the vice-chancellors of the tertiary institutions should be tasked with implementing the blended learning program in their various institutions.

From the findings in table 8, the educational leadership element has been responded to adequately and the response has been positive as shown by the mean and standard deviation, it therefore, underscored the need for educational leadership to facilitate blended learning**.** It is therefore interesting to note that the Educational leadership sprung from the need to navigate changes and adapt to the educational set up by addressing the challenges such as infrastructure, training, improvement, to enhance blended learning in particular and uncertainty in the higher education environment in general. Some of the challenges include the courage to take action when the longer-term way ahead is unclear [11].

Table 2: Significant Areas Leadership Element

	Item	Mean	Standard Deviation
	Leadership Element	**4.06**	**1.003**
LE_1	Distributed blended leadership enhances blended teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.04	.957
LE_2	Ability to sustain improvements in leadership teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.04	1.040
LE_3	Distributed leadership enhances teaching and learning of automobile technology in our tertiary institutions in Nigeria	3.96	1.002
LE_4	Leadership training enhances blended teaching and learning of automobile technology in our tertiary institutions in Nigeria	3.95	.999
LE_5	The processes of distributing leadership enhance blended teaching and learning of automobile technology in our tertiary institutions in Nigeria	4.31	.895
LE_6	The provision of infrastructural structures enhances blended leadership in our institutions	4.03	1.126

N= 571

It is therefore not surprising to suggested that a capacity to support and develop leaders capable of handling complexity, engaging people in the vision, partnering effectively and leading through change is "not a luxury but a strategic necessity" for today's universities added. Furthermore, the challenges of leadership in tertiary education are beyond the ability to guide but need an ultimate test of a leader. For this reason, the theoretical framework for the study of educational leadership should follow the ideas of John Adair and his Action-Centered Leadership Model discussed by Middlehurst [12]. A researcher further stated that Middlehurst outlined in John Adair's model, the interlinked foci on achieving the task, building and maintaining the team and developing in the individual key dimensions of leadership applicable to the university environment.

5.7 Online Element

Analysis of data collected reveals that 'online element' which is an integral component of blended learning had a grand Mean= of 2.39 and a standard deviation of 1.253 as shown in table 7. The analysis also presented the following result this includes: OE-8 Mean=2.86 SD1.464, OE-10, Mean=2.73 SD1.401, OE-11 Mean=2.68 SD1.481, OE-2 Mean=2.53 SD 1.278, OE-7Mean 2.46 SD1.323, others include OE-5 and OE-6 with Mean=2.43 each and SD 1.273 and1.255 respectively. Others include OE-4 Mean=2.37 SD1.208, OE-1Mean 2.34, SD 1.244 while OE-3 OE-12and OE-11is said to have Means 2.15 SD 1,138, 2.05 SD 1. responded to. 045 and

OE-11is said to have the lowest Mean 1.69, SD .929. Indicating that the item least responded to these means that only instrument the respondents tends to show their disagreement with indicators measuring online element. The factor was measured using twelve items on the questionnaire, however, only five out of the twelve items were able to achieve a mean score of 2.5. However the factor lowest responded to was OE-11 that is Online interaction, strengthens students and connectedness for teaching and learning of automobile technology in our tertiary institutions in Nigeria with mean of 1.69 and SD of .929 signifies that it may not be a factor as interaction, strength and students' connectedness all depends on the availability of the online equipment.

Table 3: Significant Areas Online Element

	Item	Mean	Standard Deviation
	Online Element	**2.39**	**1.253**
OE_1	Online instruction addresses pedagogical quality in blended learning for teaching and learning of automobile technology in our tertiary institutions in Nigeria	2.34	1.244
OE_2	Online instruction can be useful in identifying dangers and benefits of using technology-mediated learning tools for teaching and learning of automobile technology in our tertiary institutions in Nigeria	2.53	1.278
OE_3	Online technology offers reflective thinking for students during blended learning in our institution for teaching and learning of automobile technology in our tertiary institutions in Nigeria	2.15	1.138
OE_4	Online instruction offers increasing effectiveness and efficiency of learning in the classrooms for teaching and learning of automobile technology in our tertiary institutions in Nigeria	2.37	1.208
OE_5	The provision of rich online learning environment benefits students positively in teaching and learning of automobile technology in our tertiary institutions in Nigeria	2.43	1.273
OE_6	Teachers and students using online spend more time thinking and reflecting on their learning	2.43	1.255
OE_7	Online social connectedness is necessary irrespective of learning	2.46	1.323

	modalities in teaching and learning of automobile technology in our tertiary institutions in Nigeria		
OE_8	Online instruction for blended learning presents new opportunities for teaching and learning	2.86	1.464
OE_9	Online instruction using technology-mediated instruction enhance social connectedness in teaching and learning of automobile technology in our tertiary institutions in Nigeria	2.73	1.401
OE_10	Students using online instruction enjoy teachers support during teaching and learning of automobile technology in our tertiary institutions in Nigeria	2.68	1.481
OE_11	Online interaction strengthens students' connectedness for teaching and learning of automobile technology in our tertiary institutions in Nigeria	1.69	0.929
OE_12	Online instruction addresses pedagogical quality in blended for teaching and learning of automobile technology in our tertiary institutions in Nigeria	2.05	1.045

N = 571

5.8 Learning Outcome

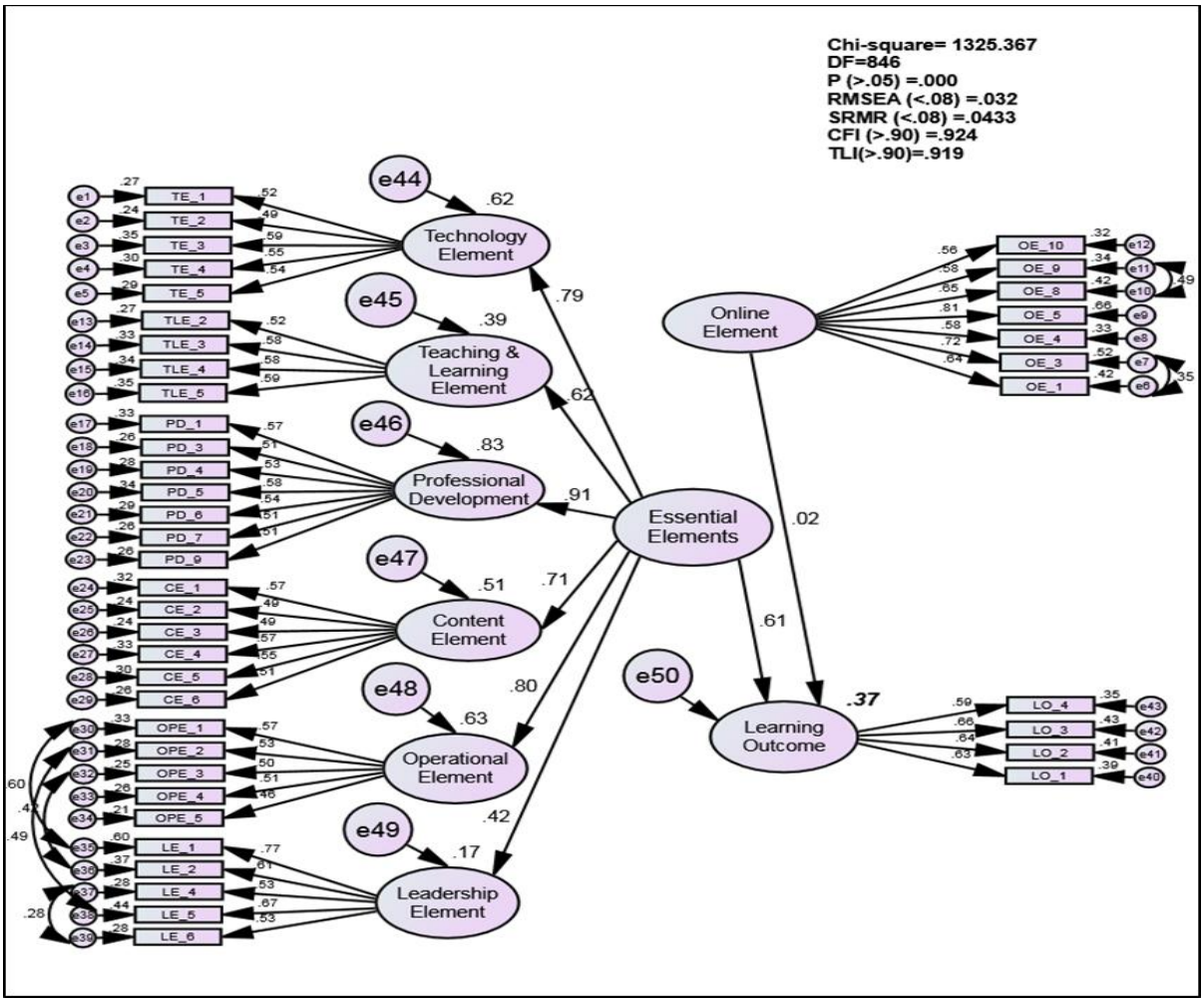
Four measuring items on the questionnaire were used to measure learning outcome. Analysis of the items indicates that all the items have performed tremendously good, as the respondents have agreed with all the items. Learning outcome has a mean value of 4.26 and a standard deviation of .877 as presented in Table 8. In this study learning outcome try to move towards a framework which a group of researchers stated that it develops a classification scheme for evaluating blended learning outcome derived from a variety of blended learning element and fundamental components of the blended learning [13].

It also tries to research into domains such as demonstration (psychomotor), knowledge through analytical skills (cognitive), in collaboration with other instructional pedagogy and human factors (affective) value as illustrated by the developed blended learning framework. The implication of this result is that it provides teachers guidance in implementing blended learning in the classroom. Finally, the study concluded that student perception may be considered very important in teaching and learning automobile technology program, other factors that can improve students' performance (grade) can be considered [14].

Table 4: Significant Areas Learning Outcome

	Item	Mean	Standard Deviation
	Learning Outcome	**4.26**	**0.877**
LO_1	I will be able to demonstrate the skills I learned from my teachers to others in a way and manner they will understand	4.31	0.877
LO_2	The knowledge acquired has molded my analytical skills	4.23	0.911
LO_3	The knowledge acquired has exposed me to work in collaboration with other colleagues	4.21	0.886
LO_4	I have the ability to comprehend knowledge acquired from the learning environment	4.29	0.834

N = 571



5.9 Summary of Result of Research Question 1

Summary of a significant element suitable for integration into blended learning for teaching automobile technology in our tertiary institutions. The summary is presented in order of significance it shows how significant.

Table 9: Summary of Results for Research Question 1

S/N	Element	Code	Mean	SD	REMARK
1	Teaching and learning	TLE	4.28	0.877	very suitable
2	Learning outcome	LO	4.26	0.877	very suitable
3	Content	CE	4.09	0.943	very suitable
4	Technology	TE	4.07	0.89	very suitable
5	Operation	OP	4.07	0.931	very suitable
6	Leadership	LE	4.06	1.003	very suitable
7	Professional Development	PD	3.41	0.95	suitable
8	Online	OE	2.39	1.253	least suitable

From the result on table 9 above, it implied that all the six essential element and the two fundamental components are suitable for integration into the blended learning teaching and learning framework as indicated by their different means and standard deviations.

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