Hybrid Teaching Approach: A Strategy for Enhancing the Mastery of Knowledge and Practical Skills in Students of Vocational and Technical Education

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Abstract
This study was aimed at investigating an effective strategy that will enhance mastery of knowledge and practical skills in teaching and learning. The study was carried out at Modibbo Adama University of Technology Yola, Adamawa State Nigeria. The sample population was drawn from three hundred level undergraduate students of Technology Education (TE) and Vocational education (VE) in the school of science and technology Education. One hundred students were purposively drawn; 70 from TE and 30 from VE. Twenty five were female and 75 male. The design adopted for the study was pretest post-test experimental non-equivalent control group. Hybrid and traditional lesson plans, Students' achievement and performance test were the research instruments developed, validated by three experts and used for data collection. Three research questions were poised and three hypotheses were formulated. Mean and standard deviation were used to analyse data to answer the research questions. The t-test analysis was used to test the hypotheses at 0. 05 level of significance. The research findings indicated that significant different exist in the performance between the students in control and experimental groups, students in experimental group performed better than those of the control group. Furthermore, results also indicated that there is no significant difference in the opinions of male and female students on the effect of hybrid method of teaching in enhancing teaching and learning. Hence, the study recommended that hybrid teaching method should be adopted as a teaching strategy in enhancing teaching and learning.

Keyword: Hybrid Teaching, Traditional Teaching. Approach (Method)

Introduction

Technical and Vocational Education Training (TVET) is used as a comprehensive term to refer to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. It is the type of education that prepares individuals to acquire knowledge and skills for gainful employment in different occupational disciplines. TVET equips its recipient to become an employee or employer of labour. Idris and Rajuddin (2012) suggested that teaching method in TVET gives more emphasis on the inspiration and flexibility, adaptability and future needs of businesses.

Teaching effectively demands that the teacher possess some basic ability to organize, co-ordinate and utilize personal qualities. He / she should also be objective and competent in lesson preparation, presentation and evaluation (Onweh & Akpan, 2014). Teachers can also motivate the learners, make students active participants in learning, use appropriate strategies and facilities to enhance effectiveness in instructions.

Instructional strategies according to Onweh and Akpan (2014) are decisions about organizing people, materials and ideas to facilitate learning. Hence instructional strategies can be seen as both the teaching method and the materials employed in the process of teaching. It is the method a teacher may take to achieve learning objectives. A key requirement for the future is the need to prepare students to participate in the information society, where knowledge and skills is the most crucial factor in the social and economic development of a country (Dimitrios, Labros, Nikolaos, Maria & Athanasios, 2013). However there is need to come up with a strategic pedagogy where mastery of knowledge and skills can be enhanced and enable the learners to compete favourably in the global market. Certain strategies and techniques have come into existence with accompanying frameworks to make the best out of every student through innovative, efficient and effective instruction. The emerging method of teaching “Hybrid Teaching” which combine the traditional and the interactive multimedia based learning has offer the benefits of both in-person and online instruction. Hybrid method allow for flexibility and choice in pedagogical strategies that work best in face-to-face and online environments. Traditional method allows for more spontaneity and immediate feedback, while online allows for more reflection, critical thinking, recollection, and conceptualization (Skibba & Ndon, 2012).

Scholars have defined hybrid method of teaching in many ways. Kalekar and Patil (2014) defined hybrid learning method as a blended learning that combines the engaging benefits of traditional instructor-led training with the advantages brought by a variety of technologies to create an optimum program. It underscores the fact that many “ingredients” can comprise a blended learning model, including instructor-delivered content, e-learning, webinars, conference calls, live or online sessions with instructors, and other media and events. Furthermore, this is an instructional practice that combines teaching methods, instruction and online learning (Nunamaker, 2014). Westover and Westover (2014) defined hybrid as classes in which instruction takes place in a traditional classroom setting augmented by computer-based or online activities which can replace classroom seat time”

Hybrid teaching method is sometimes referred to as blended learning. It is a mixture of the traditional and the on-line learning that facilitates instructions occurring both in the classroom and on-line (Vernadakis, Antoniou, Zetou, Giannousi, & Kioumourtzoglou, 2012). It is the combination of traditional teacher-led classroom instruction and independent student learning outside the classroom using online materials (Taylor, 2013). Hybrid teaching method includes traditional, multimedia and web based teaching approaches where the teacher is at liberty to use varieties of teaching methods in instructing the learner (Johnson, 2013). Thus, teacher has the flexibility to incorporate the two teaching and learning approaches and use any method he or she deems useful to increase and enhance the students' learning processes. In this case, the same multimedia courseware content can also be packaged and delivered over satellite and broadband technologies for distance learning. Here, the student learns the materials at his or her own time and interacts with the teacher via video-conferencing in real time (Neo & Neo, 2002).

In this paper however, the hybrid teaching approach is considered as a combination of traditional method of teaching, Multimedia Technology and web based learning where teaching and instructions occur on-line, in and outside the classroom**.**

Statement of the Problem

Modern age of advanced technology and Information and Communication Technology (ICT) has tremendously transformed the educational sector. The success of any educational enterprise could be measured in terms of how much instruction is given by teacher and technologies employed to guarantee maximum skills and cognitive development of learners (Reddi & Mishra, 2005). Underfunding of schools and institutions has led to lack of technical manpower and inadequate facilities for teaching practical courses. Another challenge posed by the use of ICT to enhance teaching and learning in the developing countries and Nigeria in particular are: incompetent ICT teachers; limited and low internet connectivity and lack of steady electricity. Sectarian crises which lead to the closure of schools because of the attacks on students and the schools has brought a serious challenge on the development of education in North East, Nigeria.

It is paramount to embrace teaching strategies that will be effective amidst afore-mentioned educational challenges in Nigeria so as to equip learners with the higher order thinking skills for easy adaptability and more flexibility in both virtual and physical environment. This can enhance instruction and learning within and outside the school and classroom settings (Oshinaike & Adekunmisi, 2012). Perhaps, one of the best reasons for developing hybrid teaching method is that it provides a viable option for students who seek the flexibility of distance courses but also wish to have some personal contact with faculty and other students in classroom settings. Hybrid teaching method goes beyond barriers of time, location and culture and has created many better opportunities for learning. The foregoing reasons make up the advantages of multimedia. It is on this note, that this study investigated the strategy for enhancing the mastery of knowledge and practical skills in students of vocational and technical education through hybrid teaching method.

Purpose of the Study

Specifically, the study sought to determine:

1. The impact of hybrid method of teaching on the students' academic achievement test.
2. The effect of hybrid method of teaching on gender.

Research Questions

The following research questions were asked to guide the study:

1. What is the mean performance of students taught with hybrid teaching methods and those taught with the traditional methods in students' achievement test?
2. What is the mean performance of students taught with hybrid teaching methods and those taught with the traditional methods in students' performance test?
3. What is the mean performance of male and female students exposed to the hybrid teaching method?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

Ho_1: There is no significant difference between the mean performance of students taught with hybrid teaching method and those taught with the traditional teaching method in students' achievement test.

Ho_2: There is no significant difference between the performance of students taught with hybrid teaching method and those taught with the traditional teaching method in students' performance test.

Ho_3: There is no significant difference between the performance of male and female students exposed to the hybrid teaching method.

Methodology

The pretest, post-test quasi experimental non-equivalent control group of experimental design was used. Two intact classes were assigned into experimental and control groups. Vocational Education (VE) and Technology Education (TE) students were assigned into control and experimental groups respectively. The population of the study consisted of 100 students of 2012/2013 academic session. The population was used as the sample. The sample comprises of 70 students from VE and 30 students from TE.

The instruments used for the study were hybrid lesson plan, conventional lesson plan, and materials used for designing simple hydraulic components. Multimedia CDs, video projector and tablet computers with internet access were also used. Instruments for data collection were fifty items test questions. Twenty five for achievement and 25 for performance test respectively which were designed by the researchers. The test instruments were used for both the pretest and posttest. The hybrid lesson plans, the conventional lesson plans and

students achievement and performance tests were faced and content validated by three test and measurement experts in the Department of Vocational and Technology Education MAUTECH in Yola, and Federal of University Kashire, Gombe state, Nigeria. The validations focused on adequacy of content, suitability of the test items, compare each instrument of data collection against hybrid instructional method, logical sequence and suitability of the technical term used. Their comments and suggestions were used to restructure the final instrument.

To ensure high reliability of the instruments the students' achievement test and performance test were trial tested by administering it on 20 students in 500 - level which were randomly selected in the Department of Vocational and Technology Education Abubakar Tafawa Balewa University of Technology Bauchi Nigeria. The test - retest reliability technique was adopted. The Pearson product moment correlation coefficient of the students achievement test was 0.90 and students, performance test was 0.07. This was considered suitable enough for the study. The research involved two main stages: Administration of pre-test and post-test that contained the same questions but arranged in different order. Each item of the pretest and the posttest carried two (2) marks making the total marks to be 100 percent. The study was conducted in a period of six weeks during which two topics were covered: hydraulic systems and production of hydraulic components. The pre-test was administered in the first week of the research exercise to all the students before both the experiment and control groups were subjected to the treatments. All the practical lessons were held in the Mechanical Engineering hydraulic lab of the University, with the materials provided by the university. After the administration of the pre-test, students in the experimental group were taught using the hybrid instructional method. While the control group were thought with the use of the traditional teaching method.

Experimental and control groups were taught by the researchers. The teaching process lasted for 5-weeks. Post-test was administered to all the students in the 6^{th} weeks of the exercise. The data were collected and analyzed using mean, standard deviation and t-test.

Results

Research Question 1

What is the mean performance of students taught with hybrid teaching method and those taught with the traditional teaching method in students' achievement test?

Table 1. Mean and standard deviation of pre-test and post-test performance of experimental and control group in students' achievement test.

N_1= 30, N_2= 70

Group		Pretest		Posttest		Gain in achievement Test
	N	$\bar{x}_1$	δ	$\bar{x}_2$	δ	$\bar{x}_2$-$\bar{x}_1$
Experimental	30	58.50	9.8	71.78	8.73	13.28
Control	70	54.76	10.52	62.22	8.45	7.46

The data presented in Table 1 indicated that the experimental group had a mean of 58.50 and a standard deviation of 9.80 in the pre-test and a mean score of 71.78 and standard deviation of 8.73 in the post-test. Post-test gain ($\bar{x}_2$-$\bar{x}_1$) in favour of experimental group is 13.28. The control group had a mean score of 54.76, standard deviation of 10.52 in the pre-test. A mean of 62.40, standard deviation of 9.66 in the post-test. Post-test gain ($\bar{x}_2$-$\bar{x}_1$) was 7.46.

Research Question 2

What is the performance of students taught with hybrid teaching method and those taught with the traditional teaching method in students' performance test?

Table 2. Mean and Standard deviation of pre-test and post-test performance of experimental and control group in students' performance test.

N_1= 30, N_2=70

Group		Pretest		Posttest		Gain in performance Test
	N	$\bar{x}_1$	δ	$\bar{x}_2$	δ	$\bar{x}_2$-$\bar{x}_1$
Experimental	30	42.54	12.50	72.04	8.73	29.50
Control	70	42.70	12.32	61.66.	8.45	18.96

The data presented in Table 2 indicated that the experimental group had a mean of 42.54 and a standard deviation of 12.50 in the pretest and a mean score of 72.04 and standard deviation of 8.29 in the post-test making post-test ($\bar{x}_2$-$\bar{x}_1$) gain in favour of experimental group to be 29.50. The control group had a mean of 42.70 and a standard deviation of 12.32 in the pretest and a mean of 61.66 and standard deviation of 8.63 in the post-test, making post-test ($\bar{x}_2$-$\bar{x}_1$) gain of 18.96.

Research Question 3

What is the mean performance of the male and female students exposed to hybrid teaching method?

Table 3. Mean and Standard deviation of pre-test and post-test performance of male and female students experimental and control group in students' performance test.

N_1= 22, N_2= 8

Group		Pretest		Posttest		Gain achievement Test
	N	$\bar{x}_1$	δ	$\bar{x}_2$	δ	$\bar{x}_2$-$\bar{x}_1$
Male	22	54.79	10.40	70.14	8.44	15.35
Female	8	54.50	11.12	70.71	11.24	16.21

The data presented in Table 3 indicated that male students had a mean of 54.79 and standard deviation of 10.40 in the pre-test. Mean score of 70.14 and standard deviation of 8.44 in the post-test. Post-test ($\bar{x}_2$-$\bar{x}_1$) gain by male students was 15.35. while the female students had a mean score of 54.50 and a standard deviation of 11.12 in the pre-test and a

mean of 70.71 and a standard deviation of 11.24. The gain in the post-test ($\bar{x}_2$-$\bar{x}_1$) of female students was 26.21. The difference in the scores of male and female students in performance test was 0.86.

Ho_1: There is no significant difference between the mean performance of students taught with hybrid teaching method and those taught with the traditional teaching method in students' achievement test.

Table 4. t-test analysis of mean performance of students taught with hybrid method and those taught with the traditional teaching method in students' achievement test.

Group	$\bar{x}$	δ	N	Df	Standard Error	t-cal	t-table	Decision
Experimental	7.78	8.73	50	98	7.76	2.21	1.660	Significant
Control	62.22	8.45	50					

The data presented in Table 4 shows that the t-cal (2.21) computed is greater than the critical value of t-table (1.660) at 0.05 level of significance. Therefore, the null hypothesis was rejected.

Ho_2: There is no significant difference between the mean performance of students taught with hybrid teaching method and those taught with the traditional teaching method in students' performance test.

Table 5. t-test analysis of mean performance of students taught with hybrid teaching styles and those taught with the conventional teaching method in students' performance test.

Group	$\bar{x}$	δ	N	Df	Standard Error	t-cal	t-table	Decision
Experimental	72.04	8.29	50	98	7.8	1.82	1.600	Significant
Control	61.66	8.63	50					

The data presented in Table 5 shows that the t-cal (1.82) computed is greater than the critical value of t-table (1.660) at 0. 05 level of significance. Hence, the null hypothesis was rejected.

Ho_3: There is no significant difference between the mean performance of male and female students exposed to the hybrid teaching method.

Table 6. t-test analysis of mean performance of male and female students exposed to the hybrid teaching method.

Group	_ X	Standard Deviation	N	Df	Standard Error	t-cal	t-table	Decision
Male	70.14	10.40	228	28	10.99	0.87	1.701	Not significant
Female	70.71	11.12						

The analysis on table 6 revealed that there is no significant difference between the mean performances of male and female students exposed to the hybrid teaching method. Since t-cal is less than t-table, the null hypothesis was accepted.

Findings

On the basis of the data collected and analysed for this study, the following findings were made.

i. Students taught with hybrid teaching method performed higher in the post-test than those taught with traditional teaching method in achievement test.
ii. Students taught with hybrid teaching method performed higher in the post-test than those taught with traditional teaching method in the performance test.
iii. There was no significant difference in the mean performance of male and female students taught with the hybrid method in the performance test.

Discussion of Findings

The analyses and results of this study showed that the experimental group in table 1 had higher mean performance than the control group in the post-test. This finding indicates that the hybrid teaching method has a positive effect on students' academic achievement in basic hydraulic system. This implies that key components of hybrid teaching method when used collectively are more effective than the traditional teaching method in enhancing student academic achievement. This finding is in line with the works of Uzun and Senturk (2010) who found out that the adoption of hybrid instructional method and it components greatly increases student academic achievement. The key components found in hybrid instructional method when used collectively are more effective than traditional teaching method in enhancing student academic achievement in basic hydraulic system. This means that hybrid teaching method is more effective than the traditional method when it comes to developing students in handling complex tasks such as the principle of hydraulic system, production of simple hydraulic engineering components etc.

In table 2, there is more gain in performance test in the experimental group than in the control group. Hence hybrid teaching method is proved to be more effective. This is so because hybrid teaching method is flexible in learning which significantly improves active participants in learning and make meaningful connections between: Prior knowledge and skills, new knowledge and skills, and the processes involved in learning. It also creates quality learning time for the learner to connect and apply learning experiences in real practical situations. Meydanlioglu, and Arikan (2014) concurred with the above statement when they discovered that hybrid instructional method is good and may even have the advantage in terms of improving student achievement and potentially expanding the amount of time (and quality time) students spend during learning. Hence it significantly improves active participants in their learning and makes meaningful connections between: Prior knowledge and skills, new knowledge and skills, and the processes involved in learning.

It is also in agreement with the report released by Harvard University July 28, 2014 on the pilot studies on blended learning experiments shared some similarities with this study.

Students appreciated the used of high quality of the Hybrid materials and majority are found to be interesting and engaging. The report also shown that Students valued the increased flexibility and ability to learn at their own pace, but still wanted meaningful in-person interactions with faculty and among themselves. The importance of sections, small group discussions outside of the regular class, was underscored as students said they found them vital, enabling feedback, time for questions and answers, meaningful collaborations, and a deeper sense of intellectual community. The finding also agreed with the work of Peter, Abiodun, and Jonathan, (2010) students learn and master skills better when they are allowed to participate actively in and outside the class by interacting freely with teacher and their peers, work in groups and taking instruction with diverse instructional technology as well as performing practical projects.

In table 3 and 6, the analysis shows that hybrid teaching method is not gender sensitive. The method is gender friendly. Hence, there is no significant differences between the performance of male and female students taught with hybrid teaching method. This is needful especially in Nigeria where girl child education needs to be improved. This finding was consonants with the work of John, Barchok and Ng'eno (2014) that hybrid enhances students' motivation to learn as well as bridge the gender gap that exists between boys and girls in the learning of sciences.

The implications of this study is that instructions which combine components of hybrid teaching method produce an optimal learning outcomes. Individual components of hybrid teaching method have one weakness to the other. Combining or mixing these components, eliminate all the weaknesses. Thus, teaching and learning with this method motivates, stimulates and enhances the mastery of skills and knowledge of the content of study. The method takes care of cognitive, psychomotor and attitudinal behavior of the learners across gender. Consequently, combining teacher-led instruction (traditional instruction), multimedia instruction and web based learning lead to higher academic achievement in basic hydraulic system than the traditional method.

Conclusion

All the activities and innovations in hybrid instructional method were geared towards the teaching and mastery of cognitive and practical skills that will correspondingly meet the demands of the 21st century labour market. Having found out that the hybrid instructional method has positive effect on students' academic performances, there is need to use hybrid teaching method in conventional teaching setting and distance learning system. It can also be used in a hostile environment where closure of schools, Internally Displace People (IDPs) and restriction of movement hinders teaching and learning. Policies makers, curriculum planners and teachers need to adopt this method by incorporating the components of hybrid in order to make teaching and learning process effective.

Recommendations

In regard to the results of these findings and conclusions reached in the study, the following recommendations are untaken.

1. TVET teachers should always adopt the components of hybrid teaching method in teaching and learning. This will enable them to cater for diverse learning styles of

students in their classrooms as this, will improve academic achievement and development of practical skills.

2. TVET Students should always be permitted to participate actively in class by interacting freely with the teacher and their fellow students as this will improve their academic ability and performance in their trade subject.
3. Government should provide more funds and grants to equip laboratories and workshops and ICT facilities that will facilitate hybrid teaching method.
4. TVET teachers should be given on-the-job training opportunities such as short-term courses, seminars and workshop to enable the teachers to update their knowledge; this will help them to constantly keep abreast with the ever-changing scientific knowledge and various modern methods of teaching trade subjects.

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