EQUIPMENT AND SKILLS DETERMINANTS FOR ADOPTING BLENDED INSTRUCTIONAL TECHNIQUES BY METALWORK TECHNOLOGY LECTURERS IN COLLEGE OF EDUCATION KWARA STATE

BY

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2014/1/51509TI

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NIGERIA

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A PROJECT SUBMITTED TO THE DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGERIA, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF TECHNOLOGY (B.Tech) IN INDUSTRIAL AND TECHNOLOGY EDUCATION

AUGUST, 2021

DECLARATION

I hereby declare that this titled: "**Equipment and Skills Determinants for Adopting Blended Instructional Techniques by Metalwork Technology Lecturers in College of Education Kwara State**" is a collection of my original research work and it has not been presented for any other qualification anywhere. Information from other sources (published or unpublished) has been fully acknowledged.

Taiwo, Femi Samson ……..
2014/1/51509TI SIGNATURE & DATE
FEDERAL UNIVERSITY OF TECHNOLOGY,
MINNA, NIGERIA.

CERTIFICATION

This project titled “Equipment and Skills Determinants for Adopting Blended Instructional Techniques by Metalwork Technology Lecturers in College of Education Kwara State” by: Taiwo, Femi Samson meets the regulations governing the award of B.Tech of the Federal University of Technology, Minna and it is approved for the contribution to scientific knowledge and literary presentation.

Dr. I. Y. Umar …….
SUPERVISOR Signature & Date

Dr. I. Y. Umar ……..
HEAD OF DEPARTMENT Signature & Date

Prof. I. Y. Shehu ……..
External examiner Signature & Date

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ABSTRACT

The study is to determine the Equipment and Skills Determinants for Adopting Blended Instructional Techniques by Metalwork Technology Lecturers in College of Education Kwara State. The study possesses three specific objectives to guide the study which are to identify preparation skills need of metalwork technology lecturers for the adoption of blended instructional techniques, identify the presentation skills that could influence metalwork technology lecturers in effective adoption of blended instructional techniques and evaluation skills required of metalwork technology lecturers for efficient adoption of blended instructional techniques. Three (3) corresponding research questions and null hypotheses is tested at .05 level of significance. The research design is a descriptive survey, the population of the study comprises of fifty nine (59) lecturer and (20) instructors. There was no sampling techniques for the study. The data was analyzed by computing the mean and t-test statistics. Mean was used to answer the research questions while Independent t-test was used to test the hypotheses at .05 level of significance. The findings of the study revealed identifying the needed for preparing lesson note in the most appropriate form (e.g Microsoft Word, Excel, Adobe Acrobat), selecting and integrating variety of technology that are relevant to the course content and student interest and creating documents for posting on the world wide web (www) also designing student learning activities that foster equitable, ethical and legal use of technology by students, as The study concluded that has determined skills in the areas of lesson preparation, presentation and evaluation as well as equipment needed for adopting blended instructional techniques and the students trained will be gainfully employed and be able to establish their own workshop and employ others thereby reducing the rate of unemployment in the society. The study recommended that the management of colleges of education should often organize conferences, seminars, workshops, industrial visits, training and re-training (including on-the-job trainings) for metalwork technology lecturers to acquire the new skills and to discover new equipment and their operations in metalwork industries and also Government should make provision for the equipment that are needed and not available to enable metalwork technology lecturers adopt and use the modern instructional techniques efficiently also part-time and distance learning programmes should be organized on the basis of blended instructional techniques.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Blended Instruction is one of the various methods used by teachers to deliver meaningful learning experiences. It evolved from the advancements in communication and network technologies that provide teachers with the opportunity to use other mediums in addition to face to face classroom sessions, to achieve instructional objectives. Teachers use inter/intranet to collect and post instructional materials, while students are referred to the internet, for assignments and collection of learning materials. Different training software is developed to facilitate effective teaching and learning. Such combination of instructional strategies/methods is referred to as blended instruction. Blended instruction therefore, refers to the mixture of different delivery methods and learning strategies that optimizes the learning experience of the user, in which classroom training sessions, Computer Based Training (CBT) and Web Based Training (WBT) can be combined as a way to train the learners. Blended instruction is a method for organizing the learning environment; facilitated by effective combination of different modes of delivery, models of teaching and styles of learning (Sahin, 2010 and Heinze and Procter, 2006). Driscoll (2010) and Dziuban, Hartman and Maskal, (2006) viewed blended instruction as a pedagogical approach that combines the effectiveness and socialization opportunities of the classroom with the technologically enhanced active learning possibilities of the online environment.

Learning is made more interactive and significant when students are provided with a set of tools and resources; particularly when it takes place in a more dynamic environment which blended instruction emphasizes. Woodal (2010) explained that the goal of blended instruction is to empower the individual to achieve understanding of a given topic, improve job performance skills and derive results that support employment.

For the goals of blended instruction to be achieved, Carman (2005) outlined five key ingredients as elements of blended instructional process to include: live events, online content, collaboration, assessment, and reference materials. In the same vein, Woodal (2007) and Rosset, Douglis and Frazee (2003) identified the following media platform as useful in blended instructional techniques: Live face-to-face classrooms (formal), which allows the instructor and learners to be available at the same time and in the same place where all participants share the learning experience and may interact with each other. Methods in this domain consist of instructor-led classroom, workshops/laboratory activities, coaching/ mentoring and On-the-Job Training (OJT). Instructors may also use live face-to-face classrooms (informal), where students actually have control of their learning experiences and freedom to interact with peers without the instructor looming overhead. This may include collegial connections, work teams and role modelling. Furthermore, Virtual collaboration (synchronous) may be used, which provides opportunity for the instructor and the learner to be available at the same time but in different places via the internet. The synchronous virtual collaboration consists of live e-classes and e-mentoring (coaching).

Virtual collaboration (asynchronous) is another medium where the instructor and the learners are available at different times via internet, a benefit for self-directed learners that prefer to learn at their own pace and own time. This domain consists of e-mail, online bulletin boards, and online communities. Other platforms include Performance supports; which are design to assist users with job performance media, and learning at the moment they need it, including help system, print job aids, knowledge data bases, documentation, and performance/decision support tools (Woodal, 2007). Lastly, Self-paced instruction can be used, in a manner that permits progress at the individual learner's own desired rate of learning. It allows the learner to control the timing, pace and the content of instruction. Examples include, online resource links, simulations, video and audio CDs/DVDs, and online self-assessments.

Blended instruction offers great flexibility and great effectiveness as it can offer the best medium for every instructional objective as observed by Oh and Park (2009).The potential benefits depend on the instructor's capability to appropriately integrate different delivery mediums based on the characteristics of the course and the learners. Numerous benefits in the use of blended instructional techniques were addressed by researchers. For example, Frazee's (2007) position is that, it provides a nonthreatening environment, and students feel confident about participating and asking questions in a blended delivery mode. Oh and Park (2009) noted that blended instructional techniques work well in a large classroom since it is difficult for an instructor to accommodate diverse students' needs in large classrooms. The potential uses of the techniques include increased access to course content and improved collaboration among professors and students, which makes instructional process more effective (Gautreau, 2011). Blended instruction has been adopted by many scholars in different areas of study and found effective for skill-driven learning activities. For instance, Movahedzadeh (2011) found this approach effective in teaching biology.

Metalwork Technology is an integral part of Technical and Vocational Education and Training (TVET) programme. It is one of the vocational trades offered in Colleges of Education. Metalwork trade comprises of both theory and practical that leads to the production of goods and services by the use of tools and metals (NBTE, 2001). The trade covers the following areas: Agricultural implements mechanic work, Air conditioning and refrigeration work, automobile mechanic work, fabrication and welding work, foundry work, mechanical craft (machining) work, and sheet metalwork. One of the aims of Technical education (which metalwork technology is a part) as stated by Federal Republic of Nigeria (2004) is to give training and impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant. The emphasis of government on skills acquisition led to the establishment of institutions that

emphasize skills acquisition at all levels of educational system (Ogbu, 2007). Among these institutions where metalwork technology is taught are the Colleges of Education. Fujishiro and Miyaji (2009) reported positive effect of blended instruction on oral reading performance. Based on these literatures, the researcher is of the view that effective adoption of blended instructional techniques might improve the teaching and learning of Metalwork Technology.

1.2 Statement of the Problem

The acquisition of practical and applied skills as well as the basic scientific knowledge that would facilitate occupational efficiency requires performance and skill oriented instructional situation. With the present advancement and sophistication in metalwork technology, the needed occupational efficiency seem to demand relevant skills from metalwork technology lecturers (Olorundade, 2016). This is to enable the lecturers train and impart relevant skills to the students. Moreover, the conventional methods of teaching metalwork technology (lecture, demonstration, discussion, among others) need to be supplemented with modern instructional techniques in order to meet the demands of the workplace. Despite the high desires of metalwork technology students for securing employment in industries, as observed by Peter, Abiodun and Jonathan (2010), they lack the needed work skills to secure and hold job resulting to unemployment and underemployment. Consequently, metalwork students lack interest in metalwork technology, as they graduate from school to unemployment due to absence of relevant workplace skills.

Teaching/learning process should equally be student-centered and cater for the divergent learning styles among students, which are the objectives of blended instructional techniques. However, for effective adoption of the new techniques metalwork lecturers need relevant skills and equipment to prepare, present and evaluate lessons in blended delivery mode. The

list of such skills and equipment has not been identified. Even when there are the resources to train these lecturers and buy equipment there is no guiding data to embark on such exercise.

1.3 Purpose of the Study

The purpose of this study was to identify skills and 303equipment requirements for adopting blended instructional techniques by metalwork technology lecturers in Kwara State. Specifically, the study intended to find out:

1. Preparation skills need of metalwork technology lecturers for the adoption of blended instructional techniques in College of Education in Kwara State.
2. Presentation skills that could influence metalwork technology lecturers in effective adoption of blended instructional techniques in College of Education in Kwara State.
3. Evaluation skills required of metalwork technology lecturers for efficient adoption of blended instructional techniques in College of Education in Kwara State

1.4 Significance of the Study

The findings of this study will be of immense benefit to metalwork technology lecturers, students, curriculum planners and administrators of colleges of education.

By making a copy of the document available in the various departments of metalwork technology, it will help the lecturers/instructors achieve maximum inter-institutional cooperation among metalwork technology lecturers within and outside the country via the use of the identified equipment such as internet, which in turn will improve their knowledge.

Students of metalwork technology will also benefit from the findings of this study by increasing their interest, as blended instructional techniques is aimed at making learning student-centered. Moreover, students' computer literacy will be improved as the techniques incorporate the use of computers as training medium.

The curriculum planners and the authorities of Colleges of Education will benefit from the findings by providing the list of skills and equipment needed for effective adoption of blended instructional techniques by metalwork technology lecturers. Curriculum experts will see the need to review metalwork technology curriculum with the introduction of blended instructional techniques to promote teaching and learning of metalwork technology and address the divergent learning styles of metalwork students.

1.5 Scope of the Study

The study was delimited to the skills needed for adopting blended instructional techniques by metalwork technology lecturers in the following areas of metalwork technology: Fabrication and welding work, Foundry work, Mechanical craft (machining) work and Sheet metal work.

1.5 Research Questions

The following research questions were raised to guide the study:

1. What preparation skills are needed by metalwork technology lecturers for the adoption of blended instructional techniques in College of Education in Kwara State.
2. What are the presentation skills that could influence metalwork technology lecturers in adopting blended instructional techniques in College of Education in Kwara State.
3. What are the evaluation skills required by metalwork technology lecturers for efficient adoption of blended instructional techniques in College of Education in Kwara State.

1.7 Hypotheses

The following hypotheses were formulated to guide the study and tested at .05 level of significance:

H_{01}: There is no significant difference between the mean response of metalwork technology lecturers and instructors in colleges of education on the preparation skills needed by metalwork technology lecturers for the adoption of blended instructional techniques in Kwara State.

H_{02}: There is no significant difference between the mean response of metalwork technology lecturers and instructors in Colleges of Education on the presentation skills that can influence metalwork technology lecturers in adopting blended instructional techniques in Kwara State.

H_{03}: There is no significant difference between the mean response of metalwork technology lecturers and instructors on the evaluation skills required for efficient adoption of blended instructional techniques in Kwara State.

CHAPTER TWO

2.0 LITERATURE OF REVIEW

The review of related literature was organized and presented under the following sub-headings:

2.1 Conceptual Framework

2.2 Skills in the use of Blended Instructional Techniques

2.3 Theoretical Framework

2.4 Review of Related Empirical Studies

2.6 Summary of Literature Review

2.1 Conceptual Framework

Metalwork technology refers to the art of manipulating or forming a piece of metal in to the desired shape and dimensions using tools and machines. According to Abdulrahman (1997) it is the study of the processes of reduction and refinement of metal ore and characteristics and uses of metal with the development of skills in casting, cutting shaping and treating metal. In the current study, metalwork technology refers to one of the numerous trades offered in Colleges of Education (Technical) that comprises of a mix of both theory and practical that leads to the production of goods and services by the use of tools and metals (NBTE, 2001). One of the objectives of teaching metalwork technology is the acquisition of knowledge and skills for functional living and self-reliance. The training of students in colleges of education (technical) is the responsibility of lecturers. Metalwork technology lecturers are the teachers in tertiary institutions, who had undergone approved professional training in education and in any area of metalwork; such a person possesses both technical and pedagogical qualification and is capable of imparting the required knowledge, skills and attitude to students. The knowledge, skills and attitudes acquired by students, as stated by Ogwo and Oranu (2006)

depend on the teacher, the learning experiences presented to the student and the manner of presentation of these experiences. To make the teaching-learning process effective, there is continuing need for newer and more efficient ways of presenting learning experiences such as Blended Instructional Techniques.

2.1.1 The Concept of Blended Instruction

With the advent of digital technology blended instruction merges the best features of conventional face-to-face instruction and technology mediated instructions. Today's framework of blended instruction replete with various blends that makes it difficult for educators to concur with a single definition of blended Instruction (Graham, 2006; Procter, 2003). Blended instruction has been defined as a mixture of traditional instruction and online instruction (Williams, 2016). It is also defined as the integration of e-learning tools such as virtual learning environment with face to face instruction (Welker, 2015). The aim of this type of instruction is to join the advantages of face to face classroom with the advantages of e-learning tools to enhance the learning environment (Bleed, 2011). In the current study blended instruction refers to the effective combination of different modes of delivery and learning strategies that will optimize the learning experience of the user, with emphasis on traditional classroom and technology mediated classroom, where students have to attend some lectures in the classroom (face-to-face) and take other lectures and activities through Computer Based Training (CBT), Web Based Training (WBT) and other e-learning tools. This corresponds with the opinion of Bielawski and Metcalf, as cited in Lin (2008), who defined blended instruction as the mix of traditional and interactive rich forms of classroom instruction with learning technologies. Almalki (2011) observed supportive relationship between technology based instruction component and face to face instruction. In the same vein Julian and Boone (2007) reported that blended instruction deliver a comprehensive learning experience using various methods (for example; instructor-led training, CD-ROM or

e-learning). In a related development, Valiathan (2007) stated that blended instruction is used to describe a solution that combines several different delivery methods such as collaboration software, WBT and EPSS. Driscoll (2010) summarized the term blended instruction to include the following four concepts:

1. Mixing the different types of instructional technology such as collaborative learning and virtual classroom to achieve instructional goals.
2. Integrating manifold learning theories such as cognitivism and constructivism to enhance the learning outcome.
3. Combining any type of instructional technology with face-to-face instruction.
4. Mixing instructional technology with the practical job task.

The ideal blended instruction therefore, is one that integrates a wide range of functions that empower learners with more control to participate in several formal and informal learning activities. Woodal (2007) identifies eight key steps of blended instruction which provide an overall structure to both the sequential formal training events and to the random informal blended instruction activities. The first step is the readiness step which starts the learner with the formal training that follows in sequential order. The fifth step (assessment step) allows the learner to transit in to the remaining informal events, which happens as they are needed. The eight steps are: readiness step, presentation step, demonstration step, practice step, assessment step, assistance step, mentoring step and collaboration step.

2.1.2 Advantages of Blended Instructional Techniques

Potential benefits of blended instruction include pedagogical richness (shifting from a presentational format to active learning); greater access to personalized learning, to resources and experts; greater flexibility; greater accommodation for learners and teachers of diverse backgrounds (Albrecht, 2006; Dziuban, Moskal, and Hartman, 2006); increased interaction

and sense of community; and increased cost-effectiveness (Moore, 2004; Picciano, 2006; Vaughan, 2007). The learner must continually do something in blended environment; answer a question, ask for a review, download course materials, and so on. This contrasts with the inherently passive instructional approach involved in traditional classroom lectures. Students learn at their own pace, individual learning styles are considered, resulting in increased student satisfaction. In addition, Tang and Byrne (2007) note that instructors report the following advantages of blended approaches:

- The ability to deliver lectures synchronously and asynchronously
- Opportunity to share digital course materials and learning objects with colleagues
- Effective delivery of online tutoring
- Effective course management and monitoring
- Effective students assessment and feedback
- Effective use of collaborative learning strategies.

To these, Vaughan (2007) added that blended courses were considered by lecturers to improve their delivery style and ICT skills.

2.1.3 Delivery modes in Blended Instruction

Blended Instruction is about a mixture of instructional modalities, delivery media, and instructional methods. Blends of instructional modalities usually include a balanced mixture of onsite, web-based, and self-paced learning (Martyn, 2004; Picciano, 2006; Rossett, Douglis, and Frazee, 2009). To make blended Instruction more powerful, educators can blend various media delivery types, for instance, classroom trainings, web-based courses, CD-ROMs, video, computer simulations, books, study guides, the Internet, PowerPoint slides (Bersin, 2003). In most cases, blended Instruction is designed with the use of synchronous and asynchronous web-based technologies, such as chat rooms, threaded discussions, virtual

classrooms, instant messaging, conferencing tools, bulletin boards, computer conferencing and blogs (Graham, 2006). Some researchers believe that incorporation of new pedagogies, learning theories, and instructional methods transform models of teaching and learning in blended instructional environments (Carman, 2005). The choice of the delivery mode to blend is usually determined by several factors: the nature of the course content and instructional goals, student characteristics and learning preferences, instructor experience and teaching style, online resources (Dziuban, Hartman and Moskal, 2005). Below is an example of a blend that includes both self-paced learning events (such as web-based training, tutorials, simulation exercises, and web-based assessment) and collaborative learning events (such as physical classroom, virtual classroom, peer support and learning community activities).

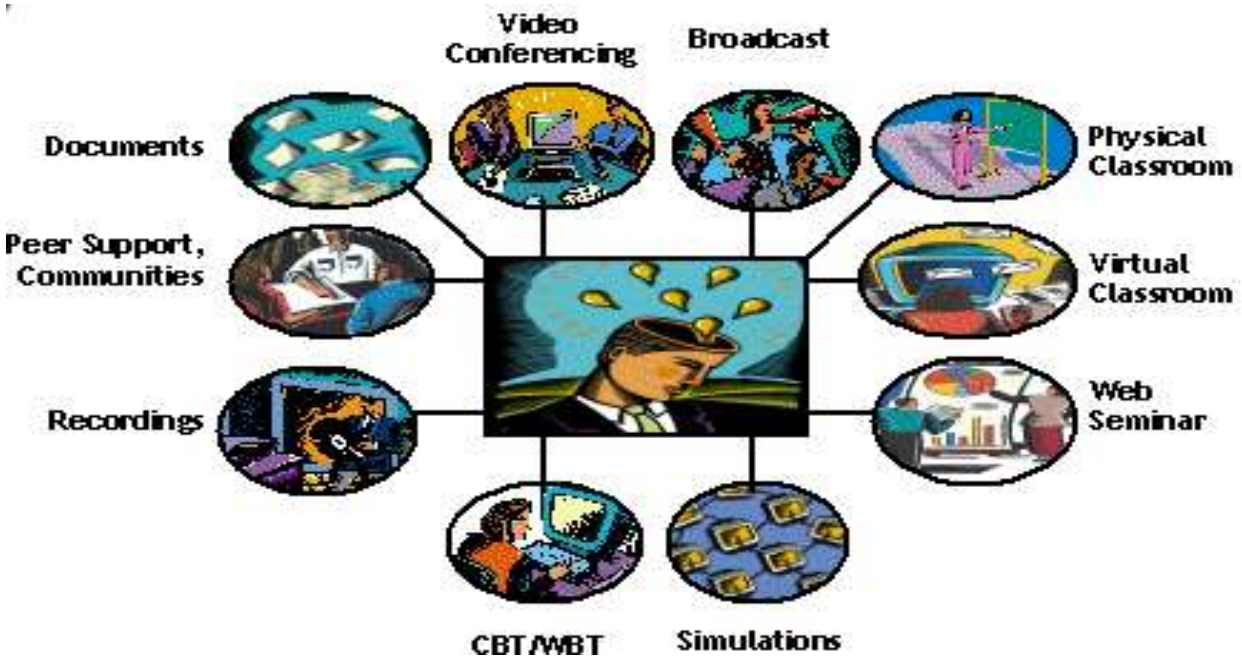

Figure 2.1: Illustration of Blended Instruction Activities. Excerpted from Basin, J. (2004)

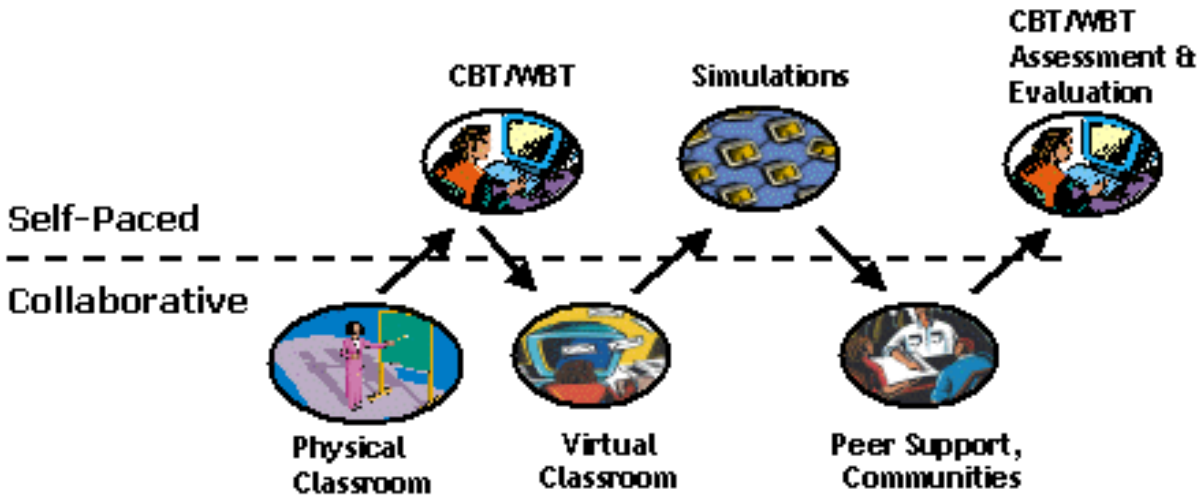

Figure 2.2: Illustration of Self-paced and collaborative learning events in Blended Instruction Activities, Excerpted from Basin, J. (2004)

2.1.4 Capabilities of Blended Instructional Techniques in teaching Metalwork Technology

The adoption of blended instructional techniques in teaching metalwork technology could be seen as flexible, student-centered and make student active participant in the teaching/learning process. The following are some of the abilities of the techniques in teaching practical skills as observed by Dziuban, Hartman and Moskal, (2005), which also applies to metalwork technology:

1. **Ability to teach a physical skill:** Most of the traditional methods of teaching are not well suited to teaching skills that involve physical action, such as running a machine. Learning that involves physically doing something is best done using the actual machine or tool. However, blended instruction may allow metalwork technology lecturers to teach practical skills using specifically designed CBT programmes. If students are to be trained using expensive or complicated equipment, or in hazardous environments, CBT can provide "practice" via simulations. With simulations,

mistakes and the learning that results from them will take place on the computer, not on the job.

2. **Ability to produce life-like images:** Some instructions require high quality visuals, such as illustrations of machine parts, to be effective. Lecture-based instructions need some augmentation to provide these visuals, which could be achieved using video, CBT or WBT in blended instructions.
3. **Ability to telescope time (time lapse or slow-mo):** Some processes (like the heat treatment process) are best shown with time-lapse video. Blended instructional techniques can do this via CBT and video extremely well. Conversely, some training may require slowing down time (showing the individual piston strokes of an internal combustion engine, for example). Again, CBT and video do this well.
4. **Ability to produce high-quality audio:** Some instructions require high quality audio reproduction to prepare trainees properly. Machine malfunctions might be best diagnosed by the sounds that they make. CBT and video are best suited to augment lectures in providing high quality audio.
5. **Ability to portray motion:** Instruction using motion can demonstrate how something is to be done, for example, assembling equipment or a piece of furniture. Lectures can be augmented to portray motion using projector, CBT and video to clearly show the action that texts and workbooks can only show pictures at various points in the process.
6. **Ability to use computers.** Computer literacy is rapidly becoming a basic skill all productive people will need to function in society and on the job, Metalwork technology lecturers and students with no exception. Blended instruction can do double duty: both providing the training content intended, and building lecturers comfort and facility with computers. Using CBT will introduce students to computers

and familiarize them with computer functions, as they may eventually use it in their places of work after graduation.

7. **Ability to provide team as well as individual study:** At times, it may be appropriate for metalwork technology lecturers to train students on how to do something as a group, (analyze production processes in order to improve quality, for example). In these cases, it is best that individuals receive instruction together, so that they can share ideas and practice techniques together. Blended instruction can do this through collaborative learning.

Considering the afore mentioned capabilities of blended instruction, there is no doubt that the new techniques require metalwork technology lecturers to alter their teaching styles and develop new skills in order to exploit the technology for the benefit of teaching and learning (Fung and Yuen, 2006).

2.1.4 Skills in the use of Blended Instructional Techniques

Teaching in blended environment requires specific sets of skills. Skill is the ability usually learned and acquired through training to perform actions which achieve desired outcome (Al-Husseini, 2006). Palloff and Pratt (2001) assert that blended instruction necessitates moving beyond traditional pedagogy to adopt new, more-facilitative practices. Levy (2003) opined that although the principles of designing blended and traditional classroom courses are similar, “instructors need training and support to be willing to adopt this new teaching paradigm [and] need to be cognizant of how the details of their course will be implemented in the new environment.” Skills needed by lecturers are grouped in to preparation skills, presentation skills and evaluation skills. Smith (2005) categorizes the skills needed by instructors in blended instructional environment to include skills needed prior to start of a course, skills needed during the course and skills needed after the course. In the same vein, Dudeney (2006) outlines the skills required by blended instructors to get started to include the

following: lesson planning skills, teaching skills, evaluation skill, e-mail skills, search skills, word processing skills and critical thinking skills.

2.1.5 Preparation Skills

Lecturers/instructors need skills prior to the start of the course, to be able to effectively prepare lessons in a blended delivery mode. A key skill is the ability to create an effective syllabus (Ko and Rosen, 2001) that lays out the terms of the class interaction, responsibilities, musts and don'ts of behaviours. Several of the other skills feed directly into this syllabus. For example, the instructor should be clear about course requirements (Palloff and Pratt, 2005), communicate high expectations (Coghlan, 2002) and define participation and grading criteria (Ko and Rosen, 2001) as these components should be spelled out in the syllabus. Instructors also need to consider factors related to management of student expectation (Ko and Rosen, 2001) because the syllabus should include information designed to dispel expectations of immediate responses to questions posed by students. The syllabus should not be regarded as inflexible, but is to provide structure for the course while allowing for flexibility and negotiation (Palloff and Pratt, 2005).

All of this and other information should be communicated in plain English (Coghlan, 2002) at a pace that avoids overwhelming new students (Smith, 2005). Instructors should be able to effectively use whatever technology has been selected for course delivery (Palloff and Pratt, 2005), this skill will be needed as the course is set up prior to commencing the first class and will continue to play an important role throughout the course, noting that additional hardware and software may need to be mastered (Conrad, 1999) because it is likely that instructors will develop content in Microsoft Word, Excel, Adobe Acrobat, or other format (and as the course progresses students probably also will submit completed work in those formats).

In addition to technological issues, instructors need to be able to set up a well-organized course site in the case of WBT (Palloff and Pratt, 2007) and translate content for online delivery (Moore, Winograd, and Lange, 2001). The latter requires information about online instruction trends and issues and a willingness to continually improve related skills and knowledge (Ko and Rossen, 2001). Web-based resources often provide a valuable resource for involving students in the search for and discovery of pertinent content, those instructors need to be able to develop exercises that take advantage of the web (Ko and Rosen, 2001). Instructors will benefit from an ability to network with others involved in blended education, continually evaluating themselves and their skills (Palloff and Parrat, 2005), and in effect becoming a life-long learner (Ko and Rosen, 2001). Additionally skills are needed to make the transition to the blended environment (Palloffand Pratt, 2005) and getting ready to prepare students for blended instruction (Ko and Rossen, 2001).

2.1.7 Presentation Skills

After a good foundation (syllabus) has been developed, course material translated, and the instructor has a good grasp of the technology, these tools can be delivered, explained to, and discussed with students. As flaws (unclear or imprecise text, unreasonable expectations, and errors) become evident, they can be corrected and modifications to course requirements negotiated. As the course begins, instructors need to transit into their role as facilitators, focusing not only on course content but also on development of community (Palloff and Pratt, 2005). By developing community, the instructor begins to address one of the primary causes for peer interaction. Phipps and Merisotis (2000) indicate that student-student and student-instructor interaction is essential. Some key aspects in community development are to promote collaborative learning (Palloff and Pratt, 2005) and develop reciprocity and cooperation among students (Merisotis and Phipps, 1999). Ideally, the instructor should also

begin to develop relationships with students (Palloff and Pratt, 2005). Especially in courses that have to be taken online, instructors will need to teach students about online learning (Palloff and Pratt, 2005), promote active learning techniques (Moore, Winograd, and Lange, 2001), and help them link this delivery mode with their own personal learning styles (Pepicello and Rice, 2000 and Merisotis and Phipps, 1999). Instructors need to accomplish all of this without overwhelming new students (Smith, 2005) who may be unfamiliar with the online learning platform, software needed to support learning, policies and procedures of the institution, basic study methods, and uncertainties inherent in electronic communication that may generate fear and anxiety.

With respect to effective and efficient course management, instructors should use best practices to promote participation (Palloff and Pratt, 2005), getting students to respect due-dates and agreed-upon working times (Gray, Ryan, and Coulon, 2004), emphasizing time on task, giving prompt feedback (Merisotis and Phipps, 1999), modeling good participation (Palloff and Pratt, 2005), and when appropriate, using humor (Coghlan, 2002). Instructors should foster learner centeredness (Hootstein, 2002), promote reflection (Palloff and Pratt, 2005), helping students to identify strengths and areas of needed improvement (Pepicello and Rice, 2000) and develop critical thinking skills (Pepicello and Rice, 2000), and encouraging them to bring real-life examples to the blended classroom (Palloff and Pratt, 2007). This learner-centered approach helps students become aware that they are valued and have information and perspectives that may aid others in their learning quests. Instructors must mandate participation and direct discussion if headed in a wrong direction (Palloff and Pratt, 2005). In WBT classes, Instructors should be willing to contact students who are not participating or are disruptive (Ko and Rosen, 2001). The instructor should remember that there are real people attached to the words on the screen (Palloff and Pratt, 2005) and respect privacy issues (Ko and Rosen, 2001). All of the above must be accomplished within the

confines of institutional performance guidelines (Smith, 2005) that, for example, may mandate or constrain times and frequency of interaction. Finally, as the course progresses, Palloff and Pratt (2005) observed that "Most of all have fun and open yourself to learning as much from your students as they will learn from one another and from you!"

2.1.8 Evaluation Skills

Whenever learning takes place the result is a definable, observable, measurable change in behavior. One of the purposes of evaluation is to determine how a student is progressing in the course. Evaluation is concerned with defining, observing and measuring or judging this new behavior. Evaluation normally occurs before, during and after instruction; it is an integral part of the training process. During instruction some sort of evaluation is essential to determine what the students are learning and how well they are learning it. The instructor's evaluation may be the result of observation of the students' overall performance, or it may be accomplished as either a spontaneous or planned evaluation, such as an oral quiz, written test, or skill performance test. Teachers who follow a systematic evaluation process will be able to precisely communicate to the students, the course requirements, standard of acceptable performance and determine the effectiveness of their instruction and students achievement (Ogwo and Oranu, 2006).

Several skills are needed by the instructor in following such systematic evaluation process, and some are useful after the course has been concluded. For example, if the course platform uses an online grade-book, the instructor ideally should be able to export the grades for transmittal to the college registrar (Ko and Rosen, 2001). Grading naturally requires evaluating students, but instructors should also reflect on the course as a whole (Palloff and Pratt, 2005). In particular, exercises, outcomes, roles, and student comments should be used by instructors to evaluate themselves (Palloff and Pratt, 2005). Instructors should give prompt

feedback to students on final papers and tests (Merisotis and Phipps, 1999), and continue to respect individual privacy issues long after the course has ended (Ko and Rosen, 2001). Mckeachie and Svinicki (2006) opined that instructors should check their evaluation methods against the goals of the course, to really assess what they hoped to achieve. Further, stated that students need practice in self-evaluation for continued learning and in peer assessment, which helps improve performance. Alternative evaluation methods should be employed by lecturers; such may include group testing which emphasizes collaborative learning and online testing which has the advantage of allowing the lecturer to give a customized test to each student through the miracles of technology and a large database of questions. Another advantage of online testing is that the instructor can include simulations that are interactive. Such questions would provide a much better test of student understanding than the static problems that can be included in paper-and-pencil tests (Mckeachie and Svinicki, 2006). In the live instructor led workshop activities, students' skills could be evaluated both in terms of process and products using the following techniques, as suggested by Jibrin (2007): rating scale, checklists, and ranking.

Rating Scales: these are evaluation instruments that design numbers of descriptive words to process and product to indicate how good they are considered to be. Table 1 below shows the format of rating scale for evaluating products.

Table 2.1: Rating Scale Format

S/N	Item rated	Very good (5) marks	Good (4) marks	Fair (3) marks	Poor (2) marks	Very poor (1) mark
1						
2						
3						

Source: Jibrin (2007)

Checklists: These are used both in the process and product evaluations. The instructor prepares a list of the things that a students should do in the process of carrying out an activity or completing a task. As the student engages in the task, the instructor observes and checks the activities or processes that are actually carried out by the student. Any activity not performed count against the student. Checklists are simple and useful in an accurate evaluation of process and product. The format is shown in Table 2.

Table 2: ***Checklist Format***

S/N	Characteristics of project	Excellent	Good	Bad
1				
2				

Source: Jibrin (2007)

Ranking: ranking is the simplest of the procedures and is employed for product evaluations. All the products submitted by the students are placed in rank order based on the possession of certain important qualities or based on the absence of defect. The instructor then assign grades, the best project might obtain highest grade, while the poorest obtain poor grade. Individual grade depends on the quality of his products when compared to the products submitted by other students.

2.2 Theoretical Framework

2.2.1 Eclecticism

The potential pedagogical strength of any form of instruction should be set against a framework of theory and practice. In the case of blended instructional techniques eclecticism is the best approach to adopt, since different theories apply to different situations, and value can be drawn from many instructional theories. Eclecticism is making decisions on the basis of what seems best instead of following some single doctrine or style. It is an approach to

thought that does not hold rigidly to a single paradigm or set of assumptions or conclusions, but instead draws upon multiple theories to gain complementary insights into phenomena, or applies only certain theories in particular cases (Tellings, 2008). He further posits that eclecticism means putting together viewpoints from different theories in to one comprehensive whole. Carman (2005) supports the use of blended theory approach in blended instructional techniques by stating that "learning theories are not like religion, you do not have to pick Catholic or Baptist or Muslim, and shun the others. The goal is to have the right theory for the right situation." The situation is dependent upon the people you serve, the nature of the skills they must master and the context in which they are to perform (Zemke, 2002). Such a situational instructional design fits well with the concept of blended instruction.

2.2.2 Keller's ARCS Model of Motivation

Keller (1987) proposes that what derives an effective instruction (live events) comes down to the four elements in his ARCS Model of Motivation. These are: Attention, Relevance, Confidence, and Satisfaction (ARCS). Keller's ARCS Model of Motivation for example, applies to the live event situation in blended instructions. Each element of Keller's model can be used to create an engaging, effective live event in blended instruction.

- **Attention:** The first aspect of the ARCS model is gaining and keeping the learner's attention. For example, an experienced blended instructor may begin his class by telling a joke, or by polling the learners with a thought-provoking question. This engages learners and prepares them for learning.
- **Relevance:** Learners stay focused when they believe the training is relevant to their specific situation. To show relevance a blended instructor may use examples or analogies familiar to the audience. Instructors may also show how learners can use course information to solve real problems.

- **Confidence:** Learners must have confidence in their skills and abilities in order to remain motivated. To instill confidence in learners, an expert instructor will make classroom expectations clear, and then give learners ample time to practice their new skills. As they experience success, learners gain confidence.
- **Satisfaction:** Finally, learners must be satisfied with the results of their learning experiences in order to remain motivated. A good instructor will do this by providing learners with opportunities to use new skills, such as having them perform hands-on exercises that simulate their work environment.

2.2.3 Constructivism

The theory of constructivism should also be considered in designing blended instruction. This theory asserts that it is experiences and the opportunity to reflect on the experiences that allow the learner to construct and understand the world around them. The constructivist theory views knowledge as a constructed entity made by each and every learner through a learning process. Constructivism frames learning less as the product of passive transmission than a process of active construction where by the learners construct their own knowledge based upon prior knowledge and experience (Piaget, 1971; Steffe and Gale, 1995). Constructivist learning requires learners to demonstrate their skills by constructing their own knowledge when solving real-world problems. Therefore, the constructivist model calls for learner-centered instruction, because learners are assumed to learn better when they are forced to explore and discover things themselves. Duffy and Cunningham (1996) shared a general view about constructivism: (1) learning is an active process of constructing rather than acquiring knowledge, and (2) instruction is a process of supporting that construction rather than communicating knowledge. This approach assumes students are active creators of knowledge and understanding. Lecturers in a constructivist classroom encourage and accept

student ideas and initiatives; use data and primary sources along with manipulative, physical, and interactive materials; encourage dialogue and questioning behavior with lecturer and fellow students; look for ways to elaborate on student responses; allow wait time after posing questions, and provide time for students to construct relationships and create meaning (Marzano, 2000).

Students in the constructivist classroom learn how to learn. In the traditional classroom, the teacher assumes the majority of the intellectual work, and learning is often a matter of a passive existence in the classroom (Ed Online, 2004). Students learn quickly that the teacher will often provide all of the information they will be expected to know and memorize. Learning follows a logical order and sequence, and many of the experiences are meant for the class as whole without much consideration of where the student might be in his or her understanding or experiences (Ed Online, 2004).In the constructivist classroom, the teacher plays a central role, more so than in most instructional design frameworks (Duffy and Cunningham, 1996). The teacher serves as a guide rather than the source of knowledge and performance required, for this new role is far more complex than traditional classroom teaching (Lincoln and Stommen, 1992).

2.3 Review of Related Empirical Studies

In this section related empirical studies with respect to blended instruction, skills and equipment that the researcher found to be relevant to this study were reviewed.

Sahin (2010) conducted a study titled blended learning in vocational education: an experimental study. The purpose of the study was to investigate whether blended learning can contribute to students' performance in vocational education (specifically in footwear design) in Technical Science College, Selcuk University, Turkey. Experimental research design was adopted. 56 students were used as respondents, 28 of whom were of control group and the

other 28 students were of the experimental group. Scores for examinations carried out before and after the training for both groups were collected as pre-and post-test results. Mean was used to analyse the result, and t-test to test the hypothesis at a significance level of 0.05. The findings of the study revealed that there was no difference in pre-test score between the control and experimental group, while the mean of final examination score was 72.1429 for the control group and 84.1071 for the experimental groups. There was also a significant difference as revealed by the t-test. The hypothesis that proposes blended learning can significantly increase students' performance in footwear design was retained. The researcher recommended that to identify other vocational areas in which blended learning models can be used more research should be carried out with an emphasis on application and practice rather than theoretical knowledge.

Akkoyuklu and Soylu (2006) conducted a study aiming at establishing the effect of blended learning on students' views, level of achievement and frequency of participation. Data was collected through the use of questionnaire, midterm achievement exam and students' participation online. The number of participants in the study was 64 students who took the course of instructional design in 2005 and 2006 in the department of computer education and instructional technology, faculty of education at Hacettepe University. Mean and standard deviation were used to analyse the data. The results of the study indicated that the level of achievement as well as frequency of participation has increased as the students' attitudes towards blended learning have become more positive. The researcher recommended that further researches should be carried out to determine teachers' perception towards and adoption of blended instructions in the faculty.

McFalin (2008) investigated the effect of a hybrid of physiology course on undergraduate students' performance at Houston University, USA involving in semesters between August,

2004 and August 2007 through the final grade of each semester. The researcher transmitted 50% of the course to a blended format using WebCT vista. A total of 658 students took part in the experiment being sub-divided in to two groups i.e. a traditional group consisted of 346 students, and a blended group consisted of 312 students. However in the first exam the blended group scored 10.5% higher than that of the traditional group. Likewise in the second exam the performance of the blended group also was 17.6% higher than that of the traditional group. Yet as for the average of the two exams, the score of the blended group was 14% higher than that of the traditional group. As for the final exam results the students who were taught by blended format scored 9.9% higher than those who used traditional format.

O'Leary (2008) conducted a study to investigate the effect of blended learning format on the improvement of student-learning outcomes in three introductory Spanish courses carried out during 2004-2005, at department of modern languages classics at the University of Alabama, USA. The researcher compared the performance of a group of students in three consecutive semesters. In one semester the students were taught the course by the traditional method five days a week, while the redesign pilot group and redesign full implementation group were taught the course by traditional method as well as electronically using WebCT four days a week and one day a week respectively. All courses were taught by the same instructor. The number of students who participated in the study was 76, of which 36 students were enrolled in the pre-redesign traditional Spanish 101, 19 students were enrolled in redesign full implementation of Spanish 103. Paper and pen comprehensive final exam, one composition, two oral interviews and midterm oral exam were used as tool for evaluation. The results of the research indicated that the second experimental group achieved a significant higher score than both the first experimental and control groups on the midterm oral interview, while there was significant difference between the three groups in the scores of remaining tools. The

researcher concluded that in the study the blended course format has a statistically significant effect on overall outcomes of the students' performance.

Alshwiah (2009) investigated the effect of blended virtual learning environment using WebCT tools and face to face lectures on the achievement and the attitude of Arabian Gulf University premedical students in the academic year 2007/2008 scoring less than 60% in their English language skills course. For that purpose, a group of 50 students was randomly selected, and then subdivided into two groups i.e. an experimental group consisting of 28 students and a control group consisting of 22 students. The experimental group was instructed a unit of English language through face to face classes and online unit on WebCT, while the control group was taught the same unit through face to face classes only. The achievement of each group was assessed by midterm exams and the final exam, and their attitude was evaluated by a five-point likert scale designed by the researcher. The result of the study revealed that there were no statistically significant differences between the two groups in terms of achievement in the final exam while the midterm exam results indicated that there was a significant difference in favour of the control group. The result also indicated that there was no significant difference between the two groups with regard to their post attitudes towards the English language.

Pereira (2007) conducted a study to investigate the effectiveness of blended instruction and traditional teaching on the academic performance and the degree of satisfaction of anatomy course students at Pompeu Fabra University in Barcelona. The blended learning group featured 69 students who were instructed the course online besides attending seminars and problem solving activities, while the traditional learning group featured 65 students who were taught the course face to face. Yet, the second group was given access to the virtual website to print lectures, notes and related images. Many programs were used to create the virtual

campus including Hot Potatoes, Macromedia Dreamweaver, and JavaScript. The achievements of both groups were evaluated through three tests at the end of the course. Standardized survey was distributed to both groups to find out their level of satisfaction. The results of the study indicated that there was a statistically significant difference between both groups in terms of academic performance and pass rate favouring the blended learning group, whereas no significant differences between the two groups were spotted regarding their overall level of satisfaction.

Bryner and Gest (2008) examined the effectiveness of blended modules of interactive learning and traditional teaching as compared to traditional teaching only on the performance, study time, perceived concept difficulty, and perceived level of stress featuring the students of the medical school at Michigan Medical University, USA. The researchers designed interactive modules on difficult concepts suggested by the faculty members of staff, who were experts in designing and teaching of preclinical curriculum. The modules were produced through the use of Macromedia flash MX 2004. The students in their first or second year at medical school were subdivided randomly into two groups i.e. a control group consisting of 53 students and an experimental consisting of 51 students. The control group was taught the course using lecture notes, books only, while the experimental group was taught the course through interactive modules and in the meantime provided with the same materials as the control group. The participants in either group had to answer a questionnaire as a requirement for the assessment of experience and prior knowledge was examined as well. The results indicated that no statistically significant differences between the two groups in terms of their knowledge and perceived level of stress, while statistically significant differences were found between them in terms of perceived concept difficulty and study time. However, as far as the experimental group was concerned the perceived concept difficulty was reduced with increasing study time.

2.4 Summary of the Reviewed Literature

This section summarizes the reviewed literature related to skills and equipment needed for adopting blended instructional techniques in teaching metalwork technology. Meanwhile new and constantly changing technologies found in teaching/learning processes continue to necessitate changes in the nature of skills and equipment used by metalwork technology lecturers to effectively train metalwork students for occupation in metalwork industries and productive self-employment.

The related literature reviewed the concept of blended instruction, advantages of blended instructional techniques and the various delivery modes in the use of the technique. Capabilities of blended instructional techniques in teaching metalwork technology were also reviewed. The researcher attempted to review the skills needed by instructors in the use of blended instructional techniques in terms of preparation, presentation and evaluation as proposed by some researchers. The need of relevant training equipment in the teaching/learning process was stressed based on the reviewed literature.

Despite the numerous advantages and benefits in the use of blended instructional techniques, which influenced metalwork technology lecturers to adopt, most researchers focused on the effect of the technique on students' performance, learners and instructors satisfaction and/or perception in different areas of learning. There was no research work conducted to find out the equipment and skills determinants for adopting blended instructional techniques by metalwork technology lecturers to serve as a guiding document. The lack of such necessitated this study in order to fill the gap, which might be useful for further researchers. The study shall focus on equipment and skills determinants for adopting blended instructional techniques by metalwork technology lecturers in Kwara State, Nigeria.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This chapter presents the design of the study, area of the study, population of the study, instrument for data collection, validation of the instrument, reliability of the instrument, method of data collection and method of data analysis.

3.1 Design of the Study

The study adopted a Descriptive survey research design. Musa, (2013) defined descriptive survey as a study that entails the systematic collection and presentation of data to give a clear picture of a particular situation. According to Gall, Gall, and Borg (2007) Survey is a method of data collection using questionnaires or interviews to collect data from a sample that has been selected to represent a population to which the finding of the data analysis can be generalized. The design was considered suitable since it allows the researcher to collect a sufficient number of responses to gain a fairly comprehensive view of the purpose of the study.

3.2 Area of the Study

Kwara State

3.2 Population of the Study

The population of the study was lecturers, comprising all metalwork technology Lecturers and Instructors in the Colleges of Education and departments of technology education in the polytechnics in Kwara State. The population comprised of 59 lecturers and twenty 20 instructors. The data was obtained by the researcher from the list of academic staff in the various departments of the selected institutions. Specifically, the institutions include: Federal College of Education (Technical) Bichi, Kano; Federal College of Education (Technical) Gusau, Isah Kaita College of Education, Katsina; College of Education Kafanchan, Kaduna;

Shehu Shagari College of Education Sokoto, Hassan Usman Katsina Polytechnic, Katsina, Kaduna Polytechnic, Kaduna; Kano State polytechnic, Kano; and Waziri Umar Federal Polytechnic, Birnin Kebbi.

3.3 Sample and Sampling Techniques

Considering the size of the population, which was small, no sampling was carried out for the study. Therefore the entire population was used.

3.4 Instrument for Data Collection

The instrument for data collection was structured questionnaire, titled: Questionnaire on Equipment and Skills Determinants for adopting Blended Instructional Techniques by Metalwork Technology Lecturers in North-Western Nigeria (QUESDABIT). 82 items were self-developed by the researcher based on the research questions and the hypotheses, out of which 77 items stood the validation exercise. The questionnaire was divided in to two parts (part I and II). Part I solicited information on personal data of the respondents (metalwork technology lecturers, instructors and H.O.Ds.).

Part II contained four sections (A, B, C and D). Section A consisted of 20 items, designed to find out preparation skills need of metalwork technology lecturers for the adoption of blended instructional techniques.The items were assigned five points response scale of Very highly Needed (VHN), Highly Needed (HN), Averagely Needed (AN), Slightly Needed (SN) and Not Needed (NN).

Section B which has 17 items, centered on the presentation skills that could influencemetalwork technology lecturers in adopting blended instructional techniques.Five points response scale of Highly Influential (HI), Influential (IF), Undecided (UD), Slightly Influential (SI) and Not Influential (NI) were assigned,

Section C which dwelled on items designed to find out evaluation skills required of metalwork technology lecturers for efficient adoption of blended instructional techniqueshad

21 items. The section was assigned the responses of Very Highly Required (VHR), Highly Required (HR), Averagely Required (AR), Slightly Required (SR), and Not Required (NR).

Section D centered on the equipment needed for the adoption of blended instructional techniques by metalwork technology lecturers and contained 19 items. 3 points responses of Needed (ND), Undecided (UD), andNot Needed (NN) were assigned to this section.

The responses in sections A, B, and C had corresponding values of 5, 4, 3, 2, and 1 respectively, while for section D Values of 3, 2, 1 were assigned.

3.5 Validation of the Instrument

Three experts face validated the instrument from the Department of Vocational Teacher Education, University of Nigeria Nsukka, Federal University of Technology Minna and Department of Education Technical, Kaduna Polytechnic.The face validation of the instrument was aimed at ensuring that the instrument would elicit the information it is designed for (Borg and Gall, 1993). Based on the experts' suggestions and recommendations, screenings and revision of the instrument were made by the researcher before the final draft was made.

3.6 Reliability of the Instrument

To determine the reliability of the instrument, a pilot test was carried out. The instrument was administered on 4 metalwork technology lecturers, 3 instructors and 1 Head of Department (HOD) in the College of Education Azare, Bauchi state, which was not in the area of the study but a neighboring state. The data collected were analyzed using Pearson's Product Moment Correlation Coefficient (PPMC) because it allows the user to obtain a quantitative precision in the measurement of the degree of relationship between two variables.The result obtained revealed a positive correlation of 'r = 0.89 for section A of the questionnaire, r = 0.79 for section B, r = 0.87 for section C and r = 0.98 for section D.

3.7 Method of Data Collection

The Questionnaire was administered and collected through personal contact by the researcher with the help of two research assistants. The research assistants were to assist the researcher in administration and collection of the instrument after a briefing session to acquaint them of the mode of administration and collection. Completed copies were collected by the researcher and the assistants after three days of administering the questionnaire. That was to facilitate high rate of return of the instrument.

3.7.1 Method of Data Analysis

The data was analyzed using Mean ($\bar{X}$) and Standard Deviation (SD). Any item with mean of 1.50 and above in sections A, B, and C and 2.5 and abovein section D was considered as needed, influential or requiredas applicable, while any item with mean of less than 1.50 for sections A, B, C, and 2.5 for section D was considered as not needed, not influential or not required as the case may be. Consider the scale below:

Response category by Sections				point	Limits
A	**B**	**C**	**D**		
Very highly Needed	Highly Influential	Very Highly Required		5	4.50 – 5.00
Highly Needed	Influential	Highly Required		4	3.50 - 4.49
Averagely Needed	Undecided	Averagely Required	Needed	3	2.50 - 3.49
Slightly Needed	Slightly Influential	Slightly Required	Undecided	2	1.50 - 2.49
Not Needed	Not Influential	Not Required	Not Needed	1	1.00 – 1.49

However, each of the four hypotheses was analyzed using ANOVA at 0.05 level of significance. The calculated value was compared to the table value in each of the cases. Any item where calculated value was less than the table value, the hypothesis of no significant difference was upheld; but if the calculated was greater than the table value, the hypothesis of no significant difference was rejected at 0.05 level of significance.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents the results of data analysis for the study. The presentation was organized according to the research questions and hypotheses formulated to guide the study.

4.1 Research Question One

What preparation skills are needed by metalwork technology lecturers for the adoption of blended instructional techniques?

Table 4.1: Mean ratings of the responses on the preparation skills needed by metalwork technology lecturers for the adoption of blended instructional techniques.

Number of respondents N=80

S/NO	ITEM	Mean	Std. Deviation	REMARK
1	Ability to prepare lesson note in the most appropriate form (e.g Microsoft Word, Excel, Adobe Acrobat).	4.41	0.52	Required
2	Ability to select and integrate variety of technology that are relevant to the course content and student interest.	4.45	0.53	Required
3	Ability to use E-mail (composes, send, reply to senders, reply to all, forward and attach files to email messages).	3.95	1.05	Required
4	Ability to retrieve and use attachments (e.g. view, read, save and print).	2.51	1.36	Required
5	Ability to conduct research (on – line) on information that support and enhance the curriculum.	4.20	0.97	Required
6	Ability to use imaging devices such as scanners, digital cameras, video cameras with computer systems and software.	4.28	0.84	Required
7	Ability to input and digitize sound from microphone and audiocassette player/recorder	2.95	1.32	Required
8	Ability to access on – line sources on information that support and enhance the curriculum	4.06	0.88	Required

9	Ability to identify, select and integrate video and digital images in varying formats for use in lesson presentations.	4.38	0.62	Required
10	Ability to use simulation materials to teach physical skills	4.36	0.56	Required
11	Ability to create documents for posting on the world wide web (www)	4.23	0.69	Required
12	Ability to design student learning activities that foster equitable, ethical and legal use of technology by students	3.21	1.55	Required
13	Ability to install computer projection device to support and deliver oral presentation and lesson`	4.23	0.82	Required
14	Ability to upload and download course materials and assignment in WBT	2.88	1.50	Required
15	Ability to install , configure and use of flash drive to store and retrieve information and resources	2.67	1.63	Required
16	Ability to run programs from CD/DVD ROMs in Computer Based Training.	2.72	1.40	Required
17	Ability to set up well – organized course site for Web based Training (WBT)	4.29	0.90	Required
18	Ability to prepare students for Web Based Training (WBT)	4.16	0.82	Required
19	Ability to use web as a resource means	3.03	1.06	Required
20	Ability to collaborate with others through available tools (e.g email, online conferences, web sites, threaded and other online discussions and on – line project) to increase knowledge and competencies for presentation	3.48	1.40	Required

The data presented in Table 4.1 shows that all the 20 items had their means above the cutoff point of 3.5. This implies that all the 20 preparation skills are required by metalwork technology lecturers for effective adoption of blended instructional techniques in Kwara State.

4.2 Research Question Two

What are the presentation skills that could influence metalwork technology lecturers in adopting blended instructional techniques?

Table 4.2

Mean ratings of the responses on the presentation skillsthat could influence metalwork technology lecturers in adopting blended instructional techniques.

		Number of respondents N=80		
S/NO	ITEM STATEMENT	**Mean**	**Std. Deviation**	**REMARK**
21	Ability to use of high quality audio to prepare trainees properly (e.g. diagnosing machine malfunctioning by sound)	4.39	.515	Influential
22	Ability to use of CBT, Video, projector or TV to portray motion (e.g. assembling equipment or a piece of furniture)	4.41	.520	Influential
23	Ability to telescope time using CBT or video (time lapse or slow mo). (E.g. showing individual piston stroke/number of rev/min of lathe machine).	4.34	.655	Influential
24	Ability to improve instructors' computer literacy and use modern instructional equipment	2.98	1.405	Influential
25	Ability to encourage active learning by using different delivery modes and learning styles.	3.15	1.223	Influential
26	Ability to give prompt feedback by integrating face – face, computer based and web based instructions.	3.86	1.260	Influential
27	Ability to emphasize time frame on each task	3.98	1.043	Influential
28	Ability to act like a learning facilitator rather than an instructor.	2.76	1.529	Influential
29	Ability to use best practices to promote participation in all the training environments (e.g. student – teacher relationship)	2.56	1.466	Influential
30	Ability to use humor during presentation	2.47	1.355	Influential

31	Ability to teach a practical skills using Computer Based Training simulations	4.08	1.022	Influential
32	Ability to show an item/picture to the entire class for discussion via projector	3.94	1.004	Influential
33	Ability to manage students' expectations (explain early and often what is expected)	2.80	1.418	Influential
34	Ability to use technology effectively (e.g. computer, web) to accomplish a variety of instructional and management goals	3.32	1.306	Influential
35	Ability to help students develop critical thinking skills (use problem solving techniques)	3.44	1.241	Influential
36	Ability to help students identify and use appropriate learning techniques (Conduct orientation session)	3.08	1.199	Influential
37	Ability to allocate assignments to students according to their pace and abilities	4.21	.852	Influential

Data presented in Table 4.2 on presentation skills that could influence metalwork technology lecturers in adopting blended instructional techniques indicates that all the 17 presentation skills are influential, having their mean ranging between 2.47 and 4.41 which is above the cutoff point of 1.5.

4.3 Research Question 3

What are the evaluation skills required by metalwork technology lecturers for efficient adoption of blended instructional techniques?

Table 4.3

Mean ratings of the responses on the evaluation skills required by *metalwork technology lecturers for efficient adoption of blended instructional techniques.*

Number of respondents N=80

S/NO	ITEM STATEMENT	Mean	Std. Deviation	REMARK
38	Ability to asses students' prior knowledge	4.55	.501	Required

	in Web Based Training (WBT) session			
39	Ability to set evaluation criteria prior to commencement of the lesson.	4.44	.570	Required
40	Ability to check evaluation methods against the objectives of lesson	4.50	.528	Required
41	Ability to provide students with clear grading criteria	3.21	1.122	Required
42	Ability to use group testing to encourage collaborative learning	3.20	1.018	Required
43	Ability to use online evaluation strategy to customize evaluation for each student	4.31	.795	Required
44	Ability to make a useful and objectives self – criticism of the previous lesson before the new one commences	4.24	.860	Required
45	Ability to use multiple assessment methods (integrate project, quizzes, written test)	4.31	.756	Required
46	Ability to encourage students' self - evaluation via D/DVD/Video or simulation devices	4.24	.851	Required
47	Ability to encourage peer – to – peer evaluation	3.85	.969	Required
48	Ability to use of unambiguous words and terms in a test	2.76	1.461	Required
49	Ability to use well designed CBT software to question students and adjust instruction accordingly	3.86	1.170	Required
50	Ability to use evaluation to retain students' interest and stimulate learning	4.04	.787	Required
51	Ability to assess the effectiveness of the instructors' training procedures by using exercises, test outcomes, roles and students' comment	4.49	.595	Required
52	Ability to use computer to develop a test item bank	4.43	.591	Required

53	Ability to use technical graphics and animations in evaluation process	4.53	.527	Required
54	Ability to use real – world scenario in evaluation process	4.53	.527	Required
55	Ability to use skill performance instruments (use of checklist, rating scale, ranking, e.t.c)	4.42	.522	Required
56	Ability to provide clear, detailed feedback on assignments and exams to enhance learning experience.	2.99	1.025	Required
57	Ability to apply self – assessment test tools on students (e.g. personnel appraisal systems and diagnostic performance assessments)	4.16	.906	Required
58	Ability to evaluate students' participation in WBT activities using different methods (e.g number of posts, attendance in chat, comments made)	4.08	.742	Required

Table 4.3 presented 21 items on evaluation skills required by metalwork technology lecturers for efficient adoption of blended instructional techniques. Each of the 21 items had a mean above the cutoff point of 1.5, ranging from 2.76 to 4.55 which indicated that all the 21 evaluation skills are required by metalwork technology lecturers for efficient adoption of blended instructional techniques in Kwara State.

4.5 Hypothesis one

Ho_1: There is no significant difference in the mean responses of metalwork technology lecturers, instructors and Heads of department (H.O.Ds) in colleges of education on the preparation skills needed by metalwork technology lecturers for the adoption of blended instructional techniques in Kwara State.

Table 4.5
Summary of ANOVA test of lecturers, instructors and Heads of department (H.O.Ds) on the preparation skills needed for the adoption of blended instructional techniques in North-Western Nigeria

Sources of Variance	Sum of Squares	DF	Mean Square	F-Cal	F-Tab	Level of Sig.	Decision
Between Groups	1.658	2	0.829	2.94	3.11	0.05	NS
Within Groups	21.731	77	0.282				
Total	23.389	79					

Decision rule: ***Reject Ho if F-cal is greater or equal to F-tab***

Data presented in Table 4.5 show that the calculated F-value is 2.94 which is less than the table F-value of 3.11 at 0.05 level of significance and 2, 77 as degrees of freedom. The result implies that the $Ho_1$of no significant difference in the mean response of metalwork technology lecturers, instructors and Heads of department (H.O.Ds) in colleges of education on the preparation skills needed by metalwork technology lecturers for the adoption of blended instructional techniques in Kwara State is retained.

4.6 Hypothesis two

Ho_2: There is no significant difference in the mean responses of metalwork technology lecturers, instructors and H.O.Ds in Colleges of Education on the presentation skills that can influence metalwork technology lecturers in adopting blended instructional techniques in Kwara State.

Table 4.6
Summary of ANOVA test on the Mean responses of lecturers, instructors and Heads of department (H.O.Ds) on the presentation skills that can influence metalwork technology lecturers in adopting blended instructional techniques.

Sources of Variance	Sum of Squares	DF	Mean Square	F-Cal	F-Tab	Level of Sig.	Decision
Between Groups	0.383	2	0.192	0.78	3.11	0.05	NS

Within Groups	18.986	77	0.247
Total	19.369	79	

Decision rule: ***Reject Ho if F-cal is greater or equal to F-tab***

Table 4.6 presented data on preparation skills that could influence Metalwork technology lectures in adopting blended instructional techniques. The calculated F-value of 0.78 is less than the table F-value of 3.11. This implies that the Ho of no significant difference in the mean responses of lecturers, instructors and H.O.Ds. on the presentation skills that could influence metalwork technology lecturers in adopting blended instructional techniques in Kwara State is retained.

4.7 Hypothesis Three

Ho$_3$ There is no significant difference in the mean responses of metalwork technology lecturers, instructors and H.O.Ds in Colleges of Education on the evaluation skills required for efficient adoption of blended instructional techniques in Kwara State.

Table 4.7
Analysis of Variance on the Mean responses of lecturers, instructors and Heads of department (H.O.Ds) on the evaluation skills required for efficient adoption of blended instructional techniques

Sources of Variance	**Sum of Squares**	**DF**	**Mean Square**	**F-Cal**	**F-Tab**	**Level of Sig.**	**Decision**
Between Groups	1.207	2	0.604	2.164	3.11	0.05	NS
Within Groups	22.786	77	0.279				
Total	23.993	79					

Decision rule – Reject Ho if F-cal is equal or greater than F-tab

The data presented in Table 4.7 shows the summary of analysis of variance on the mean responses of metalwork technology lecturers, instructors and H.O.Ds on evaluation skills required for efficient adoption of blended instructional techniques. The analysis indicated that 2.164 is the calculated F-value which is less than the table F-value of 3.12 at 2, 77 degrees of freedom and 0.05 levels of significance. Therefore, the null hypothesis of no significant difference between the mean response of metalwork technology lecturers,

instructors and H.O.Ds in Colleges of Education on the evaluation skills required for efficient adoption of blended instructional techniques in Kwara State is retained. It can be inferred that lecturers, instructors and H.O.Ds shared similar opinions.

Ho_4: There is no significant difference in the mean responses of metalwork technology lecturers, instructors and H.O.Ds on the equipment needed for the adoption of blended instructional techniques by metalwork technology lecturers in Kwara State.

4.8 Findings of the Study

Based on the data collected and analyzed, the following findings were made:

A. The preparation skills needed by Metalwork Technology Lecturers for the adoption of Blended Instructional Techniques are: skills in

1. preparing lesson note in the most appropriate form (e.g Microsoft Word, Excel, Adobe Acrobat).
2. selecting and integrating variety of technology that are relevant to the course content and student interest.
3. the use of E-mail (composes, send, reply to senders, reply to all, forward and attach files to email messages).
4. retrieving and use of attachments (e.g. view, read, save and print).
5. conducting research (on – line) on information that support and enhance the curriculum.
6. the use of imaging devices such as scanners, digital cameras, video cameras with computer systems and software.
7. inputting and digitizing sound from microphone and audiocassette player/recorder.
8. accessing on – line sources on information that support and enhance the curriculum.

9. identifying, selecting and integrating video and digital images in varying formats for use in lesson presentations.
10. the use of simulation materials to teach physical skills.
11. creating documents for posting on the world wide web (www).
12. designing student learning activities that foster equitable, ethical and legal use of technology by students.

4.9 Discussion of the Findings

Skills determinants for efficient adoption of blended instructional techniques by metalwork technology lecturers were categorized in to preparation, presentation and evaluation skills, upon which the three research questions and hypotheses of this study were formulated. This categorization is in line with the opinion of Smith (2005), who categorizes the skills needed by instructors in blended instructional environment to include skills needed prior to start of a course, skills needed during the course and skills needed after the course. In the same vein, Dudeney (2006) outlines the skills required by blended instructors to get started to include the following: lesson planning skills, teaching skills, evaluation skill, e-mail skills, search skills, word processing skills and critical thinking skills.

The data presented in Table 1 provided answer to research question one. Findings revealed that all the 20 identified skills are needed by metalwork technology lecturers to effectively prepare lessons in blended delivery mode. Lecturers need skills to prepare lesson note in the most appropriate form, to select and integrate variety of technology relevant to the course content and students' interest, to design students learning activities, and to identify, select and integrate video and digital images in varying formats for use in lesson presentations. These findings are in consonance with the assertion of (Ko and Rosen, 2001) who noted that, one of the key skills is the ability to create an effective syllabus that lays out the terms of the class interaction, responsibilities, musts and don'ts of behaviors. Further, stated that several of the

other skills feed directly into this syllabus. For example, the instructor should be clear about course requirements, communicate high expectations (Coghlan, 2002) and define participation and grading criteria (Ko and Rosen, 2001) as these components should be spelled out in the syllabus. Among others, the respondents indicated the need of skills in installing computer projection device, uploading and downloading course materials and assignment in WBT; installing, configuring and use of flash drive to store and retrieve information and resources, running programs from CD/DVD ROMs in Computer Based Training, setting up well – organized course site for Web based Training (WBT), preparing students for Web Based Training (WBT) and the use of web as a resource means. In line with this findings, is the opinion of (Palloff and Pratt, 2005), who state that instructors should be able to effectively use whatever technology has been selected for course delivery, this skill will be needed as the course is set up prior to commencing the first class and will continue to play an important role throughout the course. Conrad (1999) noted that additional hardware and software may need to be mastered because it is likely that instructors will develop content in Microsoft Word, Excel, Adobe Acrobat, or other format and as the course progresses students probably also will submit completed work in those formats. These findings indicate that teachers are deficient in preparation skills for adopting blended instructional techniques. This called for retraining of metalwork teachers to keep them abreast with the trends of event.

Based on the analysis of the research question two as in table 2, findings showed that all the skills outlined as influential in effective adoption of blended instructional techniques, are required by the lecturers. Therefore, there is the need for re-training of metalwork technology lecturers for better performance. Findings indicated that lecturers need to acquire presentation skills especially in the use of high quality audio to prepare trainees properly; use of CBT, Video, projector or TV to portray motion;telescoping time using CBT or video; giving

prompt feedback by integrating face – face, computer based and web based instructions; teaching practical skills using Computer Based Training simulations; effective use of technology (e.g. computer, web) to accomplish a variety of instructional and management goals and helping students to develop critical thinking skills (using problem solving techniques).Fung and Yuen (2006) opined that, there is no doubt that the new techniques require metalwork technology lecturers to alter their teaching styles and develop new skills in order to exploit the technology for the benefit of teaching and learning. To develop such presentation skills, lecturers need to be trained and re-trained. Levy (2003) stated that, "instructors need training and support to be willing to adopt this new teaching paradigm [and] need to be cognizant of how the details of their course will be implemented in the new environment."

Evaluation is concerned with defining, observing and measuring or judging changes in learner's behavior which occur as a result of teaching/learning processes that take place. Teachers need to follow a systematic evaluation processes to be able to precisely communicate to the students, the course requirements, standard of acceptable performance and determine the effectiveness of their instruction and students achievement (Ogwo and Oranu, 2006). Metalwork lecturers need several of skills in following such systematic evaluation process. The analysis of data in table 3 on evaluation skills required by metalwork technology lecturers for efficient adoption of blended instructional techniques revealed that all the stated skills are required. The result showed that the lecturers need skills to assess students' prior knowledge in Web Based Training (WBT) session; Set evaluation criteria prior to commencement of the lesson; check evaluation methods against the objectives of lesson and provide students with clear grading criteria. The need of these skills is buttressed by the opinion of Palloff and Pratt (2005) that, grading naturally requires evaluating students, but instructors should also reflect on the course as a whole, and set grading criteria before the

commencement of the course. In the same vein, Mckeachie and Svinicki (2006) opined that instructors should possess the skills in checking their evaluation methods against the goals of the course, to really assess what they hoped to achieve. Other areas of skills required are in the use of online evaluation strategy to customize evaluation for each student; encouraging peer – to – peer evaluation and using evaluation to retain students' interest and stimulate learning. Smith (2005) concurred that initial and ongoing training of teachers to acquire such evaluation skills, mentoring and assessment of effectiveness, are the keys to the success of blended instructional environment. The use of computer to develop a test item bank; use of skill performance instruments (checklist, rating scale, ranking, etc) and applying self – assessment test tools on students (e.g. personnel appraisal systems and diagnostic performance assessments) are other skills found required by metalwork lecturers based on the analysis. Mckeachie and Svinicki (2006), stressed the importance of these skills where stated that, alternative evaluation methods should be employed by lecturers; such may include group testing which emphasizes collaborative learning and online testing which has the advantage of allowing the lecturer to give a customized test to each student through the miracles of technology and a large database of questions. Jibrin (2007) also supported that skills could be evaluated both in terms of process and products using the following techniques: rating scale, checklists, and ranking. As such, lecturers need skills to effectively use the techniques.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary of the research problem, purpose of the study and the methodology. The summary of findings, conclusions, recommendations and suggestion for further research are also presented in the chapter.

5.1 Summary of the Study

The study adopted a descriptive survey research aimed at finding out the equipment and skills determinants for adopting blended instructional techniques by metalwork technology lecturers. The study covered all the metalwork technology lecturers in tertiary institutions that offer woodwork technology at NCE level in Kwara State. Four research questions and four hypotheses were formulated to guide the study. Solutions information to the research questions were sought and collected from 80 metalwork technology lecturers using structured questionnaire. The questionnaire consisted of two parts, part 'A' sought information about the personal data of the respondents and part 'B' which had 77 items formulated based on the research questions. The instrument was given to 3 validates who embellished them in terms of face validation, and was later trial tested on a sample of 8 metalwork technology lecturers in college of education Azare. The reliability coefficients were calculated using Pearson's product moment correlation coefficient based on the items of the research questions 1, 2, 3, 4, and were found to be 0.89, 0.79, 0.87 and 0.98 respectively. Out of the 88 questionnaires administered, a total number of 80 were duly filled and returned by the respondents which gave 90.9 percent rate of return. It was this number that was analysed to generate the data used for answering the research questions and testing the hypothesis. Mean and standard deviation were used to answer the research questions

while Analysis of Variance (ANOVA) statistics was used to test the four hypotheses formulated to guide the study at 0.05 level of significance.

Principal Findings

On the basis of the data collected and analysed the following are the principal findings of this study:

1. Metalwork technology lecturers in colleges of Education in Kwara State did not have the required preparation skills for effective adoption of blended instructional techniques.
2. Presentation skills that influence the adoption of blended instructional techniques are lacked among metalwork technology lecturers of colleges of education in Kwara State.
3. Metalwork technology lecturers in colleges of education of Kwara State need evaluation skills necessary for efficient adoption of blended instructional techniques.
4. Metalwork technology lecturers in colleges of education of Kwara State need all the equipment required in blended instructional environment.
5. Metalwork technology lecturers in colleges of education of Kwara State need training to acquire the preparation, presentation and evaluation skills required for the adoption of blended instructional techniques.
6. There is no significant difference between the mean responses of Metalwork technology lectures, instructors and Heads of department in colleges of education of Kwara State in the planning, presentation and evaluation skills required for efficient adoption of blended instructional techniques.
7. Metalwork technology lecturers, instructors and HODs shared the same opinion in the equipment needed for adopting blended instructional techniques.

5.2 Implications of the Study

The findings of this study have implications for Metalwork Technology Teachers, Management of Colleges of Education, and Nigerian Commission for Colleges of Education (NCCE). To the Metalwork Technology Teachers, the overall implication lies on the demand of large body of skills to acquire for the adoption of blended instruction to be effective. Teachers have to understand that the activities involved in teaching and learning of metalwork technology does not stop at conventional class room instruction and practical activities in the workshop only, but modern instructional techniques and advanced instructional equipment should be incorporated for effective skills transfer to the student. Therefore metalwork technology teaching and learning cannot be handled haphazardly.

The findings implied that the Management of Colleges of Education should design a comprehensive plan for the supply of the required equipment and staff development to enable teachers to acquire the new skills through training and re-training of metalwork teachers for effective adoption of blended instructional techniques in the colleges of education in Kwara State.

The Nigerian Commission for Colleges of Education (NCCE) as the agency responsible for curriculum development, programme design and accreditation of programmes in colleges of education need to review metalwork technology curriculum with a view to incorporating the skills identified for effective training of NCE technical graduates.

5.3 Conclusion

The study has determined skills in the areas of lesson preparation, presentation and evaluation as well as equipment needed for adopting blended instructional techniques. These findings represent the opinions of metalwork technology lecturers in the colleges of education who are

expected to be experienced in teaching and learning processes of metalwork technology. It is hoped therefore, that if metalwork technology lecturers are trained to acquire all the skills identified, and provided with all the equipment needed, will be able to train the students using modern instructional techniques to meet the demand of the present world of work. Hence, the students trained will be gainfully employed and be able to establish their own workshop and employ others thereby reducing the rate of unemployment in the society.

5.4 Recommendations

Based on the findings and implications of this study, the following recommendations are made:

1. The management of colleges of education should often organize conferences, seminars, workshops, industrial visits, training and re-training (including on-the-job trainings) for metalwork technology lecturers to acquire the new skills and to discover new equipment and their operations in metalwork industries.
2. Metalwork technology lecturers should be encouraged to efficiently select and integrate different forms of technology in training the students so as to cater for their diverse learning styles.
3. The NCCE should re-design the curriculum in college of education level to accommodate modern instructional techniques (blended instruction) in teaching and learning processes of metalwork technology.
4. Government should make provision for the equipment that are needed and not available to enable metalwork technology lecturers adopt and use the modern instructional techniques efficiently.
5. Part-time and distance learning programmes should be organized on the basis of blended instructional techniques.

5.5 Suggestions for Further Research

1. The study should be carried out in other geopolitical zones of the country to improve the teaching and learning processes of metalwork technology.
2. Future research may involve the views of the policy-makers and administrations in the colleges of education, as important elements of blended instruction implementations.
3. Research may be carried out to determine internet and computer literacy level of metalwork students for efficient implementation of blended techniques.
4. To identify other vocational areas in which blended instructional models can be used, more research should be carried out with emphasis on application and practice rather than theoretical knowledge.

REFERENCES

Abba, H.M. (2008). *Work-skills required by lecturers of building technology for effective teaching in tertiary institution in Bauchi and Gombe States*. Unpublished M.Ed. thesis, University of Nigeria Nsukka.

Abdullahi, S. (2010).*Electrical installation competencies required by Electrical/Electronic Teachers in Bauchi and Gombe states Technical Colleges.*Unpublished M.Ed. thesis, University of Nigeria Nsukka.

Ahmed, G. (2009). Preparing functional metalwork technology education for sustainable national development. *Bichi Journals of Technology Education. 1*, 79-84.

Ajah, M. (2012).*Levels of poverty in Nigeria*. Retrieved on 4th April, 2012, from: http://www.ureport.com/povertylevelsinnigeria-247ureport.htm

Akkoyuklu, B. & Soylu, M. Y. (2006).A study on students' views on blended learning environment.*Turkish Online Journal of Distance Education, 7(3),* 132-488.

Albrecht, B. (2006). Enriching student experience through blended learning.*ECAR Research Bulletin, 12.*fromhttp://net.educause.edu/ir/library/pdf/erb0612.pdf

Al-Hussein, A. (2006). The reality of the use of education technology in Sudanese universities and the potential obstacles (an exploratory study).*The Arab magazine for education, 24*(1), 33-39.

Almalki, A.M. (2011). *Blended learning in higher education in Saudi Arabia: A study of Umm-Alqura University.* Unpublished Ph.D. theses, RIMIT University, Riyad, Saudi Arabia.

Alshwiah, A. S. (2009). *The effects of a blended learning strategy in teaching vocabulary on premedical students' achievement, satisfaction and attitude towards English language.* Unpublished M.A. thesis, Arabian Gulf University, Saudi Arabia.

Bersin, J. (2003). *What works in blended learning*. Retrieved on 23rd February, 2011, from http://www.learningcircuits.org/2003/jul2003/bersin.htm

Bleed, R. (2001). A hybrid campus for a new millennium. *Educause Review, 36*(1), 16-24.

Borg, R. W. & Gall, M. D. (1993).*Educational Research.* New York: Longman Inc.

Bryner, B. S. & Gest, T. R. (2008).The impact of interactive, computerized educational modules on pre-clinical medical education. *Anatomical sciences education, 1 (6),* 247-251.

Carman, J.M. (2005). *Blended learning design: five key ingredients.*Retrieved on 3rd July, 2011, from http://www.agilantlearning.com/pdf/blended%20learning%20design.pdf.

Clark, R. C. (2002, August). The New ISD: Applying Cognitive Strategies to Instructional Design. *ISPI Performance Improvement Journal*, 41(7). Retrieved from http://www.clarktraining.com/CogStrat.pdf.

Coghlan, M. (2002). *Facilitating online learning.* Retrieved from http://users.chariot.net.au/~michaelc/olfac.html.

Conrad, R. (1999). *Save yourself from drowning in online interaction.* Retrieved from http://www.cren.net/~jboettch/conrad.htm.

Driscoll, M. (2010).*Blended learning: lets get beyond the Hype*. Retrieved from http://www.8.ibm.com/services/pdf/blended_learningpdf.

Dudeny, G. (2006). *The internet and the language classroom.*Cambridge: University press.

Duffy, T., & Cunningham, D. (1996).*Constructivism: implications for the design and delivery of instruction*. Retrieved from: http://citeseerx.isd.psu.edu.viewdoc/summary

Dziuban, C. D., Hartman, J. L., &Moskal, P. D. (2005). Higher education, blended learning and the generations: Knowledge is power – no more. In J. Bourne and J. C. Moore (Eds.), *Elements of Quality Online Education: Engaging Communities*.Needham; Sloan Center for Online Education.

Dziuban, C.D., Moskal, P.D., & Hartman, J.L. (2006). Blended learning.*ECAR Research Bulletin*, *7*, 1-12. Boulder, Educause Center for Applied Research.

Ed Online.(2004). *Constructivism as a paradigm for teaching and learning*. Retrieved from http://www.thirteen.org/edonline/concept2classroom/constructivism

Fagge, B.G., (2009). Modern approach in the teaching of metalwork technology: implication for technical teacher. *Bichi Journals of Technology Education. 1*,144-150.

Federal Republic of Nigeria, (2004).*National Policy on Education*,(4th Edition).Lagos, Government press.

Frank, B., (2007). *Approaches to action learning in technical and vocational education and training (TVET).*

Frazee, R.V., (2007). Using relevance to facilitate online participation in a hybrid course. *Educause Quarterly*, *4*, 67-69.

Fujishiro, N. & Miyaji, I., (2009).The effect of blended instruction on oral reading performance and their relationship to a five-factor Model of personality.*Knowledge Management and e-learning: An international journal, 2(3),* 225-245.

Fung, N.H. & Yuen, H.K. (2006).Teacher adoption of web-based learning in blended environment. *Research symposium*, Hongkong, China 6-8 February, 2006 222-230.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007).*Educational Research: An Introduction (8th ed.).* USA: Library of Congress Cataloging-in-publication Data.

Garnham C, Kaleta R (2006). Introduction to hybrid courses.*Teaching with Technology Today, 8*(6), 42-47. Retrieved on 5th February, 2012, from http://www.uwsa.edu/ttt/articles/garnham.htm

Gautreau, C. (2011). Motivational factors affecting the integration of learning management system by faculty.*The journal of education online, 8(1),* 1-25.

Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In Bonk, C. J. and Graham, C. R. (Eds.), *Handbook of Blended Learning: Global Perspectives, Local Designs.*San Francisco; Pfeiffer Publishing.

Gray, D. E., Ryan, M., & Coulon, A. (2004). The training of teachers and trainers:Innovative practices, skills and competencies in the use of e-learning. *European Journal of Open and Distance Learning*. Retrieved from http://www.eurodl.org/materials/contrib/ 2004/Gray_Ryan_Coulon.htm.

Heize, A. & Procter, C. (2008).Online communication and information technology education. Journal ofinformation technology education, 5, 235-249.

Hootstein, E. (2002). Wearing four pairs of shoes: The roles of e-learning facilitators.*Learning Circuits—E-learning 1.0, The Basics of E-learning*. Retrieved from http://www.learningcircuits.org/2002/oct2002/elearn.html.

Jain, R.K., (2009). *Production technology.* New Delhi, Khanna publishers.

Jibrin, M. A., (2007). *Principles and Practice of Education.* Kano: Adamuyoji publishers.

Julian, E. H. & Boone, C. (2007).*Blended Learning Solutions: Improving the Way Companies Manage Intellectual Capital: An IDC White Paper*. Retrieved from http://suned.sun.com/US/images/final_IDC_SES_6_22_01.pdf

Ko, S., & Rosen, S. (2001). *Teaching online: A practical guide.*Boston: Houghton Mifflin.

Levy, S. (2003). Six factors to consider when planning online distance learning programs in higher education. *Online Journal of Distance Learning Administration* 4(1).Retrieved from http://www.westga.edu/%7Edistance/ojdla/spring61/levy61.htm.

Lin, H. (2008). Blending online components into traditional instruction in pre-service teacher education: the good, the bad, and the ugly.*International Journal for the Scholarship of Teaching and Learning*, *2*(1), 1-14.

Lincoln, B., & Stommen, E. (1992).Constructivism, technology and the future of classroom learning.*Education and Urban Society*, *24*(4), 466-476.

Mamman, Y.A. (2009).*Workshop Practice Management Skill Improvement needs of Electrical/Electronic teachers in Technical Colleges in Adamawa, Bauchi and Gombe states.* Unpublished M.Ed. thesis, University of Nigeria Nsukka.

Martyn, M. (2004). The hybrid online model: Good practice. *Educause Quarterly, 1,* 18-23. Boulder, EDUCAUSE Center for Applied Research.

Marzano, R. (2000). Twentieth century advances in instruction. In *Education in a newera,* (67-95). Alexandria: Association for Supervision and curriculumDevelopment

McFarlin, B. K. (2008). Hybrid lecture online format increases student grads in an undergraduate exercise physiology course at a large urban university. *Advances in Physiology Education. 32,* 86 -91.

McKeachie, W.J., & Svinicki M. (2006). *Teaching Tips.* New York: Houghton Mifflin Company.

Merisotis, J. P., & Phipps, R. A. (1999). What's the difference? *Change 31*(3), 12-17.

Merrill, M.D. (1994). *Instructional Design Theory*. Englewood Cliffs, New Jersey: Educational Technology Publications.

Michael E. W. (2007). *Career - Technical Education Equipment Guide.* Retrieved from www.ncpublicschools.org

Moore, G. S., Winograd, K., & Lange, D. (2001).*You can teach online: Building a creative learning environment.* New York: McGraw Hill.

Moore, J. C. (2004). *ALNprinciples for blended environments: A collaboration*. The SloanConsortium. Retrieved from http://www.sloanc.org/publications/books/alnprinciples2.pdf

Movahedzadeh, F., (2011).Improving students' attitude towards science through blended learning.*Science education and civic engagement, 3(2),* 13-19.

Muhammad, D. (2008). *Assessment of the adequacy and utilization of electricity/electronics workshop equipment in Technical colleges in Kaduna State*. Unpublished Master's thesis, Abubakar Tafawa Balewa University, Bauchi.

Musa, S. (2013).*Work-based skills for enhancing school-to-work transition of Metalwork Technology Graduates of Technical colleges in Kaduna state*.Unpublished Master's thesis, University of Nigeria, Nsukka.

National Board for Technical Education, (2001).*National Technical Certificate (NTC) andAdvanced National Technical Certificate (ANTC) Curriculum and Module Specifications in motor Vehicle Mechanic Work*. Kaduna, NBTE.

National Commission for Colleges of Education (NCCE), (2008).Garki, Abuja:NCCE.

Nwachukwu, C.E., (2006). *Designing Appropriate Methodology in Vocational and Technical Education for Nigeria.* Nsukka, University Trust Publishers.

O'Leary, M. B. (2008). *A case study of student learning outcomes based on the implementation of a blended course format in introductory Spanish.*Unpublished Ph.D. dissertation, University of Alabama, Tuscaloosa, USA.

Ogbu, R.O., (2007). *Assessment of the utilization level of facilities for teaching and learning of metalwork in vocational technical colleges in Benue state of Nigeria.*Unpublished M.Ed. Thesis, University of Nigeria, Nsukka.

Ogbuanya, T.C. & Fakorede, S.O. (2009). Technical skills improvement needs of metalwork technology teachers for entrepreneurship in response to MDG for quality assurance: *A Journal of the Nigeria Vocation Association (*NBA), 13 (1).

Ogwo, B.A. & Oranu, R.N. (2006).*Methodology in formal and non-formal technical/vocational education.* Enugu: Ijejas Printers & Publishers.

Oh, E. & Park, S., (2009). How are universities involved in blended instruction? *Educational Technology & Society, 12(3),* 327-342.

Okorie, J.U., (2001). *Vocational and Industrial Education.* Bauchi, League Publishers.

Okoro, O.M., (1993). *Principles and Methods in Vocational Technical Education.* Nsukka: University Trust Publishers.

Osguthorpe, R. & Graham, C. (2003). Blended learning environments: Definitions and directions. *The Quarterly Review of Distance Education, 4 (3),* 227-233.

Palloff, R. M., & Pratt, K. (2005).*Lessons from the cyberspace classroom: The realities of online teaching.* San Francisco: Jossey-Bass.

Palloff, R. M., & Pratt, K. (2007).*The virtual student: A profile and guide to working with online learners.* San Francisco: Jossey-Bass.

Pepicello, B., & Rice, E. (2000).Reshaping teaching and learning: The role of liberal arts in online education. In K. W. White & B. H. Weight, (Eds)*The online teaching guide: A handbook of attitudes, strategies, and techniques for the virtual classroom.* Boston: Allyn and Bacon.

Pereira, J. (2007). Effectiveness of using blended learning strategies for teaching and learning human anatomy. *Medical Education. 41,* 189-195.

Peter, I.O., Abiodun, A.P. & Jonathan, O.O. (2010).Effects of constructivism instructional approach on teaching practical skills to mechanical related trade students in western Nigeria technical colleges.*International NGO journal, 5(3),* 059-064.

Phipps, R., & Merisotis, J. (2000).*Quality on the line: Benchmarks for success in Internet-based distance education.* Washington, DC: The Institute for Higher Education Policy. Retrieved from http://www.ihep.com/Pubs/PDF/Quality.pdf.

Piaget, J. (1973). *The development of thought: Equilibrium of cognitive structures.* New York: Viking Press.

Picciano, A. G. (2006). Blended learning: Implications for growth and access. *Journal of Asynchronous Learning Networks, 10(3),* 56-62.

Procter, C. (2003). *Blended learning in practice. Proceedings of Conference on Education in a Changing Environment 2003*.Salford, UK: The University of Salford.

Rosset, A., Douglis, F. & Frazee R.V., (2009). Strategies for building blended learning. *Learning Circuits.* Retrieved from http://www.essentiallearning.net/news/ strategies%20for%20Building%20Blended%20 Larning.pdf.

Sahin, M., (2010). Blended learning in vocational education: An experimental study. *International Journal of Vocational and Technical Education, 2(6),* 95-101. Retrieved fromhttp://www.academicjournals.org/IJVTE.

Scida, E. E. & Saury, R. E. (2006). Hybrid courses and their impact on student and classroom performance: a case study at the University of Virginia. *Calico Journals, 23 (3),*517-531.

Simm, C. (2011). *Required equipment for a computer based training lab*. Retrieved from:http://www.ehow.com/facts_7818746_required-equipment-computerbased-training-lab.htm

Smith, T. C. (2005). Fifty-one competencies for online instruction.*The Journal of Educators Online, 2* (2).Retrieved fromhttp://www.thejeo.com/Ted%20Smith%20Final.pdf

Steffe, L.P., and Gale, J. (Eds.) (1995).*Constructivism in Education*. New Jersey: Lawrence Erlbaum Associates.

Tang, M., & Byrne, R. (2007). Regular versus online versus blended: A qualitative description of the advantages of the electronic modes and a quantitative evaluation. *International Journal on E-learning, 6*(2), 257-266.

Tellings, A. (2008), eclecticism and integration in educational theories: a meta-theoretical analysis. *Educational Theory, 51*: 277–292. Illinois: John Wiley & Sons,

Utts, J. (2003). A study comparing traditional and hybrid internet-based instruction in introductory statistics classes.*Journal of Statistics Education. 11(3),* 33-39.

Valiathan, P. (2007). Blended learning models. Learning circuits. Retrieved from: http://www.learningcircuits.org/2007/aug2007/valiathan.html

Vaughan, N. (2007). Perspectives on blended learning in higher education.*International Journalon E-Learning, 6(1),* 81-94.

Vygotsky, L. (1978). *Mind in society: the development of higher psychological processes*. Cambridge, Harvard University Press.

Welker, J. & Berardino, I. (2006). Blended learning: understanding the middle ground between traditional classroom and fully online instruction. *The Journal of Educational Technology Systems, 34 (1),* 33-55.

Wenger, E. (1998). *Communities of practice: learning, meaning, and identity*. Cambridge: Cambridge University Press.

Williams, C. (2002). Learning on-line: A review of recent literature in a rapidly expanding field.*Journal of Further and Higher Education, 26(3),* 263-272.

Woodall, D. (2007). *Blended learning solutions for smaller companies*.Retrieved from business training library, www.bizlibrary.com

Woodall, D. (2010). *Blended learning strategies: selecting the best instructional methods*. Retrieved from http://www.skillsoft.com/news/whitepapers.asp

Zemke, R. (2002). Who Needs Learning Theory Anyway?*Training Magazine*, 39(9), 86-88.

APPENDICES

Appendix A

Letter of request for validation

Department of Vocational Teacher Education,
Industrial Technical Education Unit,
University of Nigeria,
Nsukka.
October 22, 2012

Dear Sir/ Madam,

REQUEST FOR INSTRUMENT VALIDATION

I am a postgraduate student of the above named department, university of Nigeria, Nsukka, currently undertaking a research project aimed at investigating the **"Equipment and Skills Determinants for Adopting Blended Instructional Techniques by Metalwork Technology Lecturers in Kwara State".**

Attached is the copy of the questionnaire, purpose of the study, research questions and hypotheses. You are please requested to vet the items for clarity and relevance of their consistency and validity.

Please use the sheet provided for general comments and suggestion you deem necessary. Your response will be held in strict confidence.

Thanks.

Yours faithfully,
Baffa, Dauda Muhammad
PG/M.ED/09/51913

Appendix B

Request for Completion of Questionnaire

Department of Vocational Teacher Education,

Industrial Technical Education Unit,

University of Nigeria Nsukka,

July 22, 2013.

Dear Sir/Madam,

REQUEST TO RESPOND TO A QUESTIONNAIRE

I am a post graduate student in the Department of Vocational Teacher Education, University of Nigeria, Nsukka, currently undertaking a research project. The title of the project work is **"Equipment and Skills Determinants for Adopting Blended Instructional Techniques by Metalwork Technology Lecturers in Kwara State".**

The attached questionnaire is to elicit the necessary information for the research project. You are requested to respond to the items as objectively as possible.

Any information supplied will be treated confidential and will be used strictly for the research work. Thanks.

Yours Faithfully,

Baffa, Dauda Muhammad

APPENDIX C

QUESTIONNAIRE

QUESTIONNAIRE ON EQUIPMENT AND SKILLS DETERMINANTS FOR ADOPTING BLENDED INSTRUCTIONAL TECHNIQUES (QUESDABIT) BY METALWORKTECHNOLOGY LECTURERS IN KWARA STATE

PART A

PERSONAL DATA

Please indicate by checking (√) in the appropriate box provided against the data below:

(i) Type of teacher; Lecturer [ ], Instructor [ ], H.O.D. [ ].

PART B

SECTION A: Preparation skills needed by Metalwork Technology Lecturers for the adoption of Blended Instructional Techniques.

Please rate, by checking (√) the appropriate column, the extent to which the following preparation skills are needed by metalwork technology lecturers in adopting blended instructional techniques.

Key: (HN) = Highly Needed,(AN) = Averagely Needed, (UD) = Undecided,
(SN) = Slightly Needed, (NN) = Not Needed

S/No	Item	HN	AN	UD	SN	NN
1	Ability to prepare lesson note in the most appropriate form (e.g. Microsoft Word, Excel, Adobe Acrobat)					
2	Ability to select and integrate variety of technology that are relevant to the course content and student interest					
3	Ability to use e-mail (compose, send, reply to sender, reply to all, forward and attach files to email messages)					
4	Ability to retrieve and use attachments (e.g., view, read, save, and print)					

5	Ability to conduct research (on-line) on information that support and enhance the curriculum					
6	Ability to use imaging devices such as scanners, digital cameras, video cameras with computer systems and software					
7	Ability to input and digitize sound from microphone and audiocassette player/recorder					
8	Ability to access on-line sources of information that support and enhance the curriculum					
9	Ability to identify, select, and integrate video and digital images in varying formats for use in lesson presentations.					
10	Ability to use simulation materials to teach physical skills					
11	Ability to Create documents for posting on the world wide web (www)					
12	Ability to design student learning activities that foster equitable, ethical, and legal use of technology by students					
13	Ability to install computer projection device to support and deliver oral presentations and lessons					
14	Ability to upload and download course materials and assignmentin WBT					
15	Ability to install , configure, and use of flash drive to store and retrieve information and resources					
16	Ability to run programs from CD/DVD ROMs in Computer Based Training (CBT)					
17	Ability to set up well-organized course site for Web Based Training (WBT)					
18	Ability to prepare students for Web Based Training					

	(WBT)					
19	Ability to useof web as a resource means					
20	Ability to collaborate with others through available tools (e.g., email, on-line conferences, web sites, threaded and other on-line discussions and on-line projects) to increase knowledge and competencies for presentation					

SECTION B: Presentation skills that could influence metalwork technology lecturers in effective adoption of blended instructional techniques.

The following presentation skills could influence metalwork technology lecturers in adopting blended instructional techniques; rate the level of influence of each item by checking (√) the appropriate column that best describes your opinion.

Key: Highly Influential = (HI), Influential = (IF), Undecided = (UD),

Slightly Influential = (SI), Not Influential = (NI)

S/No	Item	HI	IF	UD	SI	NI
21	Ability to use of high quality audio to prepare trainees properly (e.g. diagnosing machine malfunctions by sound)					
22	Ability to use of CBT, Video, projector or TV to portray motion (e.g. assembling equipment or a piece of furniture)					
23	Ability to telescope time using CBT or video [time lapse or slow-mo]. (e.g. showing individual piston stroke/number of rev/min of a lathe machine)					
24	Ability to improve instructors' computer literacy and use of modern instructional equipment					

25	Ability to encourage active learning by using different delivery modes and learning styles					
26	Ability to give prompt feedback by integrating face-to face, computer based and web based instructions					
27	Ability to emphasize time frame on each task					
28	Ability to act like a learning facilitator rather than an instructor					
29	Ability to use best practices to promote participation in all the training environments (e.g. student-teacher relationship)					
30	Ability to use humor during presentation					
31	Ability to teach a practical skills using Computer Based Training simulations					
32	Ability to show an item/picture to the entire class for discussion via projector					
33	Ability to manage students' expectations(explain early and often what is expected)					
34	Ability to use technology effectively (e.g. computer, web) to accomplish a variety of instructional and management goals					
35	Ability to help students develop critical thinking skills (use problem solving techniques)					
36	Ability to help students identify and use appropriate learning techniques(Conduct orientation session)					
37	Ability to allocate assignments to students according to their pace and abilities					

SECTION C: Evaluation skills required by Metalwork Technology Lecturers for Efficient adoption of Blended Instructional techniques

Indicate your opinion by checking (√) the appropriate column, on the requirement of the following evaluation skills by metalwork technology lecturers for efficient adoption of blended instructional techniques.

Key: Very highly Required= (VHR), Highly Required (HR), Averagely Required = (AR), Slightly Required = (SR), Not Required = (NR)

S/No	Item	VHR	HR	AR	SR	NR
38	Ability to assess students' prior knowledge inWeb-Based Training (WBT) session					
39	Ability to set evaluation criteria prior to commencement of the lesson.					
40	Ability to check evaluation methods against the objectives of the lesson					
41	Ability to provide students with clear grading criteria.					
42	Ability to use group testing to encourage collaborative learning					
43	Ability to use online evaluation strategy to customize evaluation for each student					

44	Ability to make a useful and objective self-criticism of the previous lesson before the new one commences					
45	Ability to use multiple assessment methods (integrate project, quizzes, written test)					
46	Ability to encourage students' self-evaluation via CD/DVD/ Video or simulation devices					
47	Ability to encourage peer-to-peer evaluation					
48	Ability to use of unambiguous words and terms in a test					
49	Ability to use well designed CBT software to question students and adjust instruction accordingly					
50	Ability to use evaluation to retain students' interest and stimulate learning					
51	Ability to assess the effectiveness of the instructor's training procedures by using exercises, test outcomes, roles and students' comment					
52	Ability to use computer to develop a test item bank					
53	Ability to use technical graphics and animations in evaluation process					
54	Ability to use real-world scenarios in evaluation process					
55	Ability to use skill performance instruments (use of checklist, rating scale, ranking, etc.)					
56	Ability to provide clear, detailed feedback on assignments and exams to enhance learning experience.					
57	Ability to apply self-assessment test tools on students (e.g. personnel appraisal systems and diagnostic performance assessments)					

58	Ability to evaluate students' participation in WBT activitiesusingdifferent methods (e.g. number of posts, attendance in chat, comments made)					

SECTION D: Equipment needed for the adoption of Blended Instructional Techniques by Metalwork Technology Lecturers.

Rate by checking (√) the appropriate column, the extent to which the following equipment are needed by metalwork technology lecturers for the adoption of blended instructional techniques.

Key: (ND) = Needed, Undecided (UD), (NN) = Not Needed

S/No	Item	ND	UD	NN
59	Audio cassette recorder			
60	Calculator			
61	Camcorder (digital)			
62	Digital Camera			
63	Web Camera			
64	Computers (installed with a suitable operating system and appropriate training software)			
65	Copier			
66	Digital projector			
67	DVD player			
68	DVD (R/RRW)			

69	Television (TV)			
70	Interactive white board			
71	Internet facilities			
72	Microphone(web-enabled)			
73	Overhead projector			
74	Printer			
75	Scanner			
76	USB Flash Drive			
77	Video Cassette Recorder (VCR)			